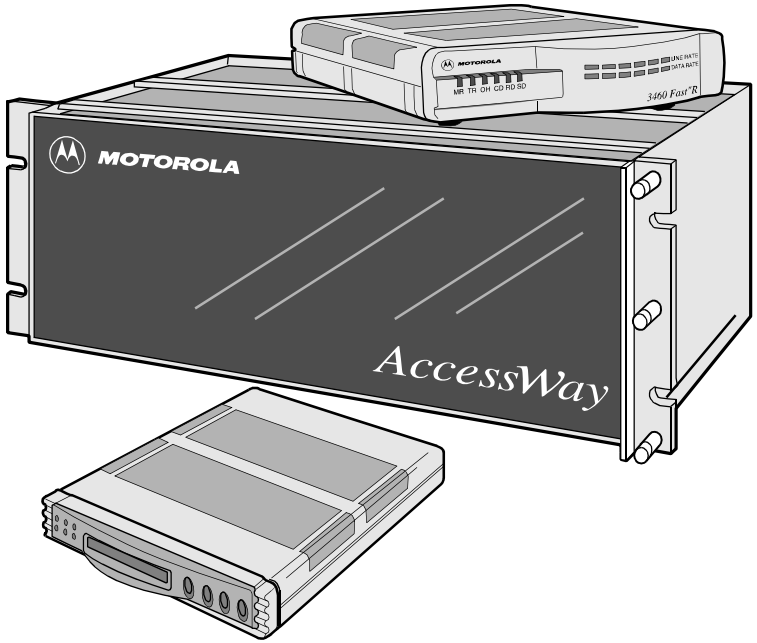
Motorola

3460 Fast'R User Guide



Notices

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About This Guide

Introduction

This guide describes Motorola 3460 Fast'R Modem hardware and software installation and operation.

Audience

This manual is intended for operators of the Motorola 3460 Fast'R and Fast'R Plus Modem and the Vanguard 3460 V.34 Daughtercard modem.

Other Documentation

For more modem information, refer to the *3460 Fast'R Modem Reference Guide* (Part No. T0022), which you can download from the Motorola World-Wide Web site (**www.mot.com/MIMS/ISG/mue/**). The *Reference Guide* also provides:

- Equipment service, repair, and return information
- Contact information for billing and training questions
- Contact information for ordering additional documentation

Special Notices

The following notices emphasize certain information in the guide:

IMPORTANT: *Emphasizes significant procedural information.*

Caution

Warns you against damage to software, hardware, or data.

Mise en Garde

Une mise en garde vous fournit des informations qui, si elles ne sont pas observées, peuvent se traduire par des dommages pour le logiciel, le matériel ou les données.

Vorsicht

Ein Vorsichtshinweis macht Sie darauf aufmerksam, daß Nichtbefolgung zu Software-, Hardware- oder Datenschäden führen kann.

¡Precaución!

La precaución le ofrece información, que de no cumplirse, puede derivar en posibles daños tanto para el software y el hardware, como para ambos.

Warning

Warns you against physical injury.

Avertissement

Un avertissement constitue le message le plus sérieux, indiquant que vous pouvez subir des blessures corporelles.

Warnung!

Eine Warnung ist der ernsthafteste Hinweis auf Körperverletzungsgefahr.

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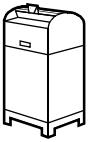

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Chapter 1
Hardware Installation

Introduction

The Motorola 3460 Fast'R or 3460 Fast'R *Plus* modem provides reliable data communication to meet a wide variety of networking requirements.

The 3460's formations include:

- A stand-alone formation with either:
  - — A modem that supports a two-wire leased-line or dial-line connection
  - — A modem that supports a two- or four-wire leased-line connection or a dial connection

  Some stand-alone modems have an LCD display and four menu-navigation buttons, so you can set configuration options and monitor operation by directly accessing the modem.
- An Accessway enclosure-card formation with either:
  - — A pair of modems that support two-wire leased-line or dial-line connections
  - — A modem that supports a two- or four-wire leased-line connection or a dial connection
- A Vanguard daughtercard formation with a modem that supports a two- or four-wire leased-line connection or a dial connection

The 3460's **features** include:

- Synchronous and asynchronous communication in one unit, with two preset configurations for typical applications
- Automode with telephone-number linking and auto-redial
- ITU TS Compliance to V.34, V.32bis, V.32, V.29, V.27ter, V.23, V.22, V.22bis, V.21, V.17, Bell 212A, Bell 103
- Synchronous data rates up to 33.6 KBPS and asynchronous data rates up to 230.4 KBPS
- Industry-standard error detection and data compression
- Hayes AT and V.25bis support

- Automated software download and flash memory for easy upgrades
- V.54 diagnostic test suite
- LED displays that indicate modem activity
- Light bar displays (stand-alone modem only) that indicates line, data, and link-utilization rates
- Support for the Motorola 9000 Open Management System (OMS) Network Management System
- Support for secondary-channel modem management
- Restoral: automatic rerouting of data traffic to the PSTN, over a two-wire dial line, for backup of critical leased-line applications when a leased line fails or signal quality deteriorates. Restoral is available on units that support four-wire leased-line operation.
- Support for Fax Class 1, Class 2.0, and Group 3 fax standards, to enable transmission and receipt of faxes at up to 14.4 KBPS (with a fax application installed)
- LCD display and menu-navigation buttons, on some stand-alone modems

For instructions on installing a Vanguard 3460 V.34 Daughtercard in a Vanguard enclosure, refer to the *Vanguard Daughtercard Installation Guide* (Part No. T0020-02).

Installing a Stand-Alone Modem

In the shipping carton, locate the items shown in Figure 1-1.

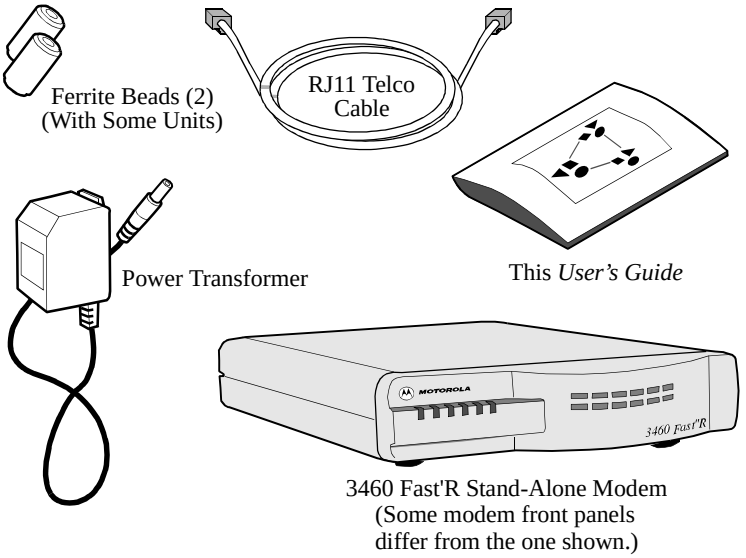


Figure 1-1. 3460 Fast'R Stand-Alone Modem Parts

Installing a Stand-Alone Modem

Step	*Action*
1.	Compare the modem package contents to Figure 1-1. If a part is missing, contact your nearest Motorola representative, or: • In the U.S.A.—Motorola Customer Administration, 20 Cabot Blvd., Mansfield, MA 02048. (508) 261-4745. • Outside the U.S.A.—Motorola distributors are listed on our Web site, at: **http://www.mot.com/MIMS/ISG/**
2.	Plug the modem power-transformer cable into the modem's **AC~** connector and then into a power supply outlet.
3.	Connect a cable from a computer serial port to the modem's DTE connector.

Installing a Stand-Alone Modem *(continued)*

Step	Action
4.	If ferrite beads are included with your modem, install them on both telephone cables: a) Snugly wrap the cable once completely around the bead (Figure 1-2). b) Set the cable into the bead cutouts. Ensure that 2.5 to 4 cm of the cable extend from the bead (on the end you insert into the modem connector). c) Snap the bead closed. You can reopen and close it to reset the cable.
5.	For **two-wire leased-line or dial-line modems:** a) Plug the telephone cable into the modem's LINE connector (Figure 1-3) and to the telephone wall jack. b) To use a telephone set on the same line as the modem, ensure that the ferrite bead (if included) is installed on the cable; then plug it into the modem's PHONE connector. For **two- or four-wire leased-line/dial-line modems**: a) Optionally, plug an analog dial line telephone cable into the modem's PHONE LINE connector (Figure 1-3) and to the telephone wall jack. b) Ensure that the ferrite bead (if included) is installed on a leased-line cable; then plug it into the modem's LEASE connector.
6.	Set the modem power switch to the **On (1)** position. The modem executes self-tests. A modem indicates test results as follows: • *Successful completion*: MR LED steady on. • *A problem* by setting LEDs in one of these ways: — MR: slowly blinking. TR: on. OH: off. CD: off. — MR: off. TR: on. OH: on. CD: on. You can also check self-test completion with Fast'RVu. Select **Status**, then select: • **EIA** to display DCD, DTR, DSR, CTS, and RTS signal states • **Device** to display rate and mode parameters that describe the modem's current state Note the LED pattern. Report any problem to Motorola Support.
7.	Stand-alone modem hardware installation is complete. Go on to Chapter 2, Basic Modem Setup, or Chapter 3, Advanced Modem Setup.

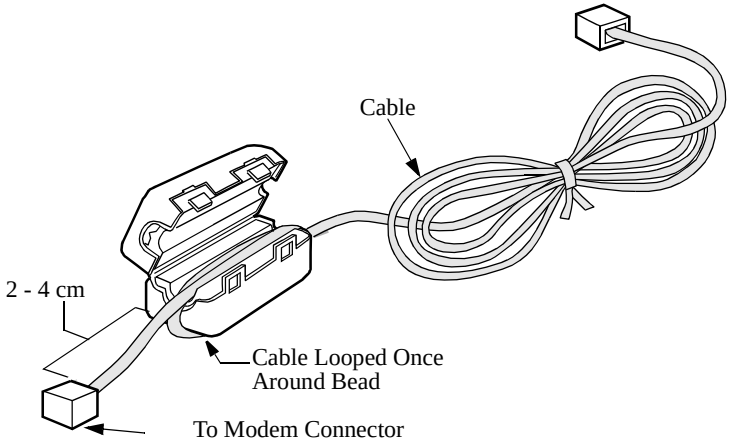


Figure 1-2. Ferrite Bead Installation

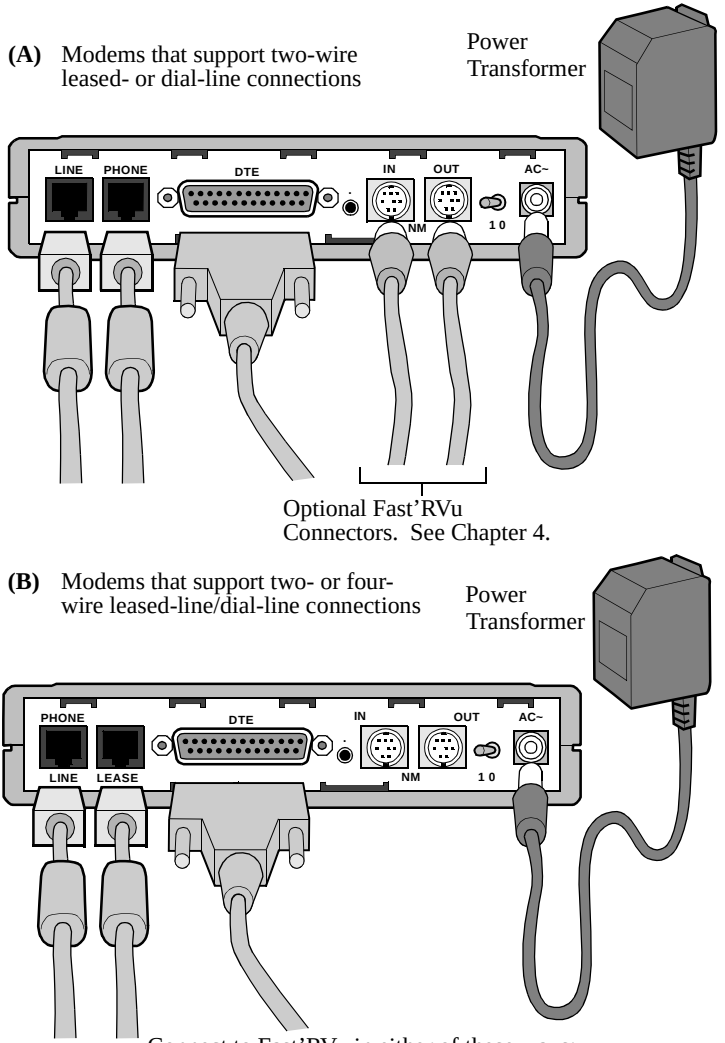


Figure 1-3. Modem Rear Panel and Cable Connections

Safety and Operational Notices

Power Transformer

Warning

The stand-alone modem is for use with an approved power transformer, available only from Motorola, Inc.

Avertissement

Le modem autonome doit être utilisé avec un transformateur de courant homologué, disponible uniquement auprès de Motorola, Inc.

Warnung

Das freistehende Modem ist mir einem zugelassenen, ausschließlich von der Motorola, Inc. erhältlichen Leistungstransformator zu verwenden.

Connecting Ports

Warning

Ports that are capable of connecting to other apparatus are defined as SELV. To ensure conformity with EN60950 - ensure that these ports are only connected to ports of the same type on other apparatus.

Warning

Les ports qui sont susceptibles d'être connectés à des équipements sont désignés comme TBTS. Pour garantir la conformité à la norme EN 60950, n'interconnecte ces ports qu'avec des ports du même type sur des autres matériels.

Warning

Anschlusse, die mit anderen Geraten verbindet werden konnen, sind als SELV beschrieben. Um Konformitat mit EN 60950 zu versichern, sichern Sie es, daß diese Anschlusse nur mit den des selben Type auf anderen Geraten verbindet werden.

Repair

Warning

Do not attempt to repair the modem or enclosure. They contain *no* electronic components that can be serviced or replaced by a user. Any attempt at user service of the modem or enclosure, or opening of the modem, voids the product warranty.

Avertissement

N’essayez pas de réparer le modem ou le boîtier. Ils ne contiennent aucun composant électronique pouvant être réparé ou remplacé par un usager. Toute tentative de réparation du boîtier du 3460 Fast’R ou de l’AccessWay 16 par un usager, ou toute intervention à l’intérieur du 3460 Fast’R, annule la garantie du produit.

Warnung

Versuchen Sie nicht, das Modem oder sein Gehäuse zu reparieren. Es sind keine durch den Benutzer wartungs- oder austauschfähige Teile darin enthalten. Bei jeglichem Öffnen oder Wartungsversuch am 3460 Fast'R bzw. AccessWay 16-Schaltkasten durch den Benutzer verfällt die Gerätegarantie.

Lightning

Warning

All Motorola devices should be used in environments designed for computers and electronic equipment. **In areas susceptible to lightning, take precautions to prevent damage to electronic equipment**. Contact your telephone company, or an electronic accessories vendor, for information on lightning protection equipment. Customers experiencing problems caused by surges from lightning have eliminated such problems by installing appropriate **surge suppressors** on power and data lines connected to Motorola devices.

Avertissement

Tous les dispositifs Motorola doivent être utilisés dans des environnements conçus pour des ordinateurs et du matériel électronique. Dans les zones susceptibles d'être frappées par la foudre, prenez des précautions pour éviter que le matériel électronique soit endommagé. Contactez votre compagnie téléphonique, ou un vendeur d'accessoires électroniques, pour obtenir des renseignements concernant les systèmes de protection contre la foudre. Certains usagers confrontés à des problèmes causés par des sautes de tension dues à la foudre ont éliminé ces problèmes en installant des régulateurs de tension appropriés sur les câbles électriques et les câbles de données reliés aux dispositifs Motorola.

Warnung

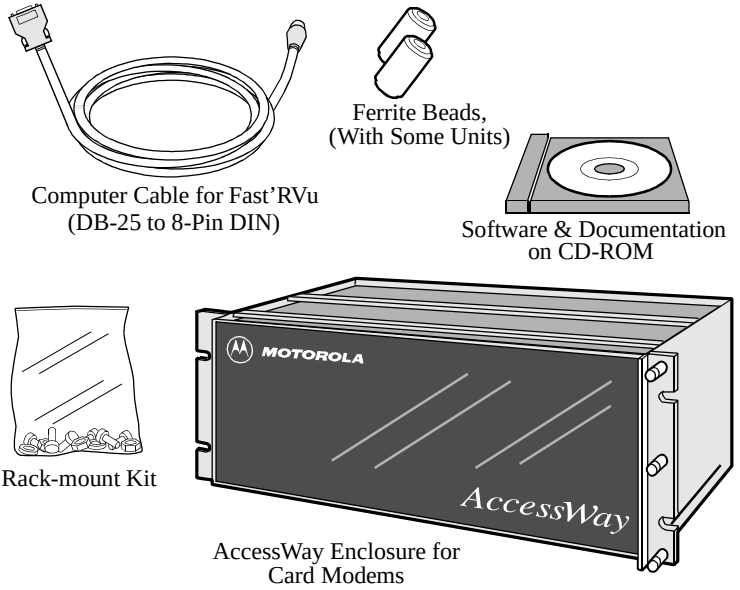
Motorola-Geräte sind grundsätzlich in für Rechner und elektronische Anlagen vorgesehenen Umgebungen zu verwenden. In unwettergefährdeten Bereichen ist jegliche Elektronik gegen Blitzeinwirkung zu schützen. Näheres über entsprechende Schutzeinrichtungen erfahren Sie von Ihrer Telefongesellschaft oder einem Elektrohändler. Probleme mit Spannungsstößen durch Blitzeinwirkung lassen sich durch Einbau von Überspannungsableitern in die zu Motorola-Geräten führenden Netz- und Datenleitungen beheben.

Installing an AccessWay Enclosure

The AccessWay enclosure houses up to 16 Fast'R modem cards and a power module.

Checking AccessWay Enclosure Shipment

In the shipping carton, locate the items shown in Figure 1-4.



If a part is missing, contact Motorola as described in the installation instructions. Order card modems, power cable, and telephone cables separately.

Figure 1-4. AccessWay Enclosure Shipment Contents

Site and Power Preparation

Ensure that there is sufficient cooling space around the Accessway enclosure, according to the following specifications.

Cooling for One or Two Enclosures

When one or two enclosures are mounted in a rack or cabinet, one directly above the other, with no other equipment directly below, natural convection provides sufficient airflow through the enclosures.

When one or two enclosures are rack-mounted with other equipment directly below that produces rising heat, a 9 cm space is required between the enclosure and the other equipment to exhaust hot air from below. A **deflector** must be fitted into this space to avoid mixing the air flows (Figure 1-5).

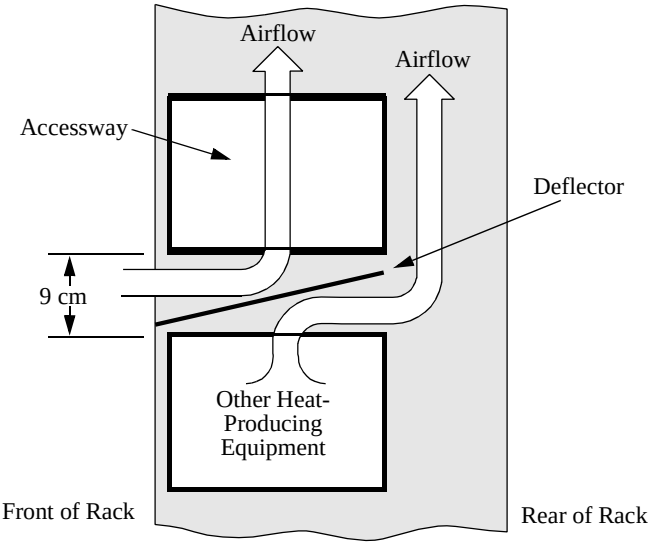


Figure 1-5. Cabinet Arrangement—One or Two Enclosures

Cooling for Three or More Enclosures

When three or more enclosures are mounted in a rack or cabinet, forced-air cooling with fans and a deflector is required.

Fan and Deflector Requirements

Forced-air cooling for up to four rack-mounted enclosures can be provided by fans and a deflector, mounted below the enclosures, to provide passive, bottom-entry rear exhaust and upward-forced, front-entry cooling air. Refer to Figure 1-6. The airflow requirement is 80 CFM (2266230 CCM).

For example, three fans rated 117 CFM (202176 CCM) at a static pressure of 0 inches of water provide enough airflow, when cooling four enclosures. The deflector ensures that hot air from equipment below the enclosures does not mix with enclosure-cooling air. The cabinet must have venting at the top or rear to let exhaust air escape.

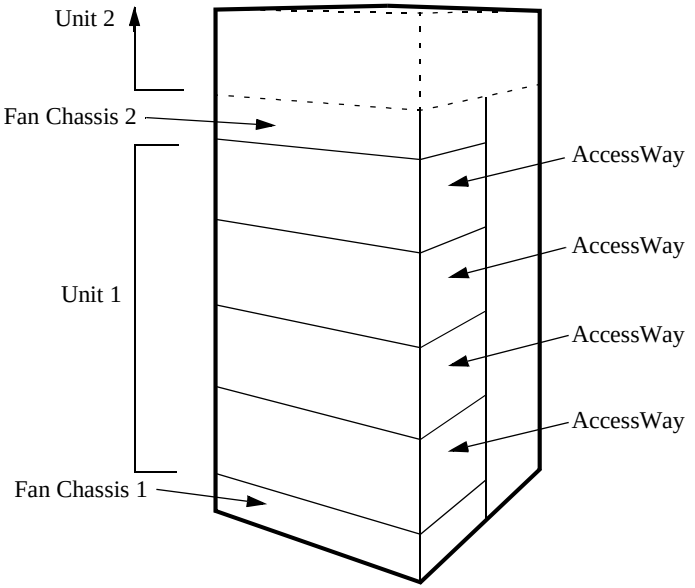


Figure 1-6. Cabinet Arrangement—Three or More Enclosures

Caution

Failure to comply with these requirements may result in thermal/electrical stress that can affect reliability or cause serious damage to components.

Avertissement

Le non respect de ces normes pourra donner lieu des contraintes thermiques/lectriques susceptibles d'affecter la fiabilit des composants ou de les endommager srieusement.

Vorsicht

Nichtbefolgung dieser Vorkehrungen kann zu thermischer bzw. elektrischer berlastung und zu Unzuverlssigkeit oder ernsthafter Beschdigung der Bauteile fhren.

Selecting a Power Cord

The connector should meet the requirements of CEE Pub. 22, Standards Sheet V, BS 4491, CSA C22.2, DIN 49 457, UL 498, UL 817, and VDE 0625. The entire assembly should meet all safety requirements in the country of use. The AccessWay power cord and plug should meet the standards in Table 1-1 and Table 1-2.

Table 1-1. Power Cord and Plug Standards - Types

Group	*Plug Type*	*Plug Standard*	*Cord Standard*[1]
1	Schuko	CEE Pub. 7	HD-21 (HAR[2])
2	Australian	SAA3112-1981	SAA3191-1981
3	British	BS 1363	BS 6500 (HD-21 HAR)
4	Danish	AFSNIT 107	HD-21 (HAR)
5	Indian	BS 546	HD-21 (HAR)
6	Israeli	S. I. 32	HD-21 (HAR)
7a	North American	NEMA 5-15 (125V)	SJT
7b	North American	NEMA 6-15 (250V)	SJT
8	Swiss	SEV 1011.1959	HD-21 (HAR)

Table 1-1. Power Cord and Plug Standards - Types

Group	Plug Type	Plug Standard	Cord Standard[1]
9	Permanently connected	EN60950	HD-21 (HAR)
10	China	GB 2099	GB 5023

[1]Cord size should be 0.75 mm or 18 AWG minimum.
[2]Cords listed as HAR should bear the marking <HAR>

Table 1-2. Power Cord and Plug Standards - Countries

Group	Country
1	Austria, Algeria, Azerbaijan, Belarus, Belgium, Bolivia, Bulgaria, Chile, Czech Republic, Croatia, Egypt, Estonia, Finland, France, Germany, Greece, Hungary, Indonesia, Jordan, Khazakstan, Kyrgyzstan, Latvia, Lebanon, Lithuania, Morocco, Netherlands, Norway, Poland, Portugal, Romania, Russia, Slovakia, Slovenia, Spain, Sweden, Tunisia, Turkey, Ukraine, Uruguay, Uzbekistan
2	Argentina, Australia, China, New Zealand
3	Bahrain, Botswana, Cyprus, Ghana, Hong Kong, Ireland, Kuwait, Malaysia, Oman, Qatar, Singapore, United Arab Emirates, United Kingdom
4	Denmark
5	India, Pakistan, South Africa, Sri Lanka
6	Israel
7a	Belize, Bermuda, Brazil, Canada, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Japan, Mexico, Nicaragua, Panama, Peru, Philippines, Puerto Rico, Saudi Arabia, Taiwan, Trinidad, Venezuela, United States of America
7b	230 V Applications: Canada, Korea, Thailand, United States of America
8	Switzerland
9	Norway, Sweden
10	China

Installing the Enclosure in an Equipment Rack

Place the AccessWay enclosure in a 19-inch (48.3 cm) EIA/RETMA equipment rack or cabinet.

Installing an AccessWay in an Equipment Rack

Step	*Action*
1.	Slide the enclosure into the equipment rack.
2.	Secure the enclosure brackets to the equipment rack, using the hardware provided in the rack-mount kit.
3.	Ensure that the enclosure is ventilated and cooled according the guidelines in this chapter.

Warning

All Motorola devices should be used in environments designed for computers and electronic equipment. In areas susceptible to lightning, take precautions to prevent damage to electronic equipment. Contact your telephone company, or an electronic accessories vendor, for information on lightning protection equipment. Customers experiencing problems caused by surges from lightning have eliminated such problems by installing appropriate surge suppressors on power and data lines connected to Motorola devices.

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Cabling an AccessWay Enclosure

Connect cables to the AccessWay as follows. See Figures 1-7 and 1-8.

Cabling an AccessWay Enclosure

Step	*Action*
1.	In enclosures with mass-termination telephone connectors, attach ferrite beads (Figure 1-7), if they are supplied, to the multi-line cables from the telephone service outlets to the two mass-termination connectors on the AccessWay rear panel. Attach the beads within 2 - 4 cm of the AccessWay panel. Pass the cable straight through the bead, without turns. **Note**: The AccessWay mass-termination backplane does not support two- or four-wire leased-line/dial-line cards. To mix these cards with two-wire leased-line or dial-line cards, the AccessWay must have the RJ-11 backplane.
2.	Ensure that telephone lines are configured and connected to the service provider's outlet or closet connection.
All cables should be emissions-shielded.	

Cabling an AccessWay Enclosure *(continued)*

Step	Action
3.	If you plan to configure modems by issuing commands: • D*irectly to each modem:* connect a shielded cable from a computer's serial port to a modem DTE connector. (After configuring a modem, move the connector to another modem.) • *With Fast'RVu over a direct cable connection, or with a locally attached Motorola network management system (NMS):* connect the shielded NMS cable from the computer or NMS's serial port to the enclosure's NM IN connector. In enclosures with mass-termination telephone connectors, install a ferrite bead on each NMS cable, near the AccessWay panel. Pass the cable through the bead twice, with one full turn. • *With Fast'RVu over a secondary-channel connection*, you do not need a special cable connection.
4.	Optionally, on DC powered enclosures, install a second DC power module. Installation is described later in this chapter.
5.	Connect the power cable from the AccessWay rear panel to a power source. The enclosure is factory-configured for one power input type: AC or DC. Your power source must match.
All cables should be emissions-shielded.	

Figure 1-7 shows how to attach a ferrite bead to a mass-termination multi-line telephone cable.

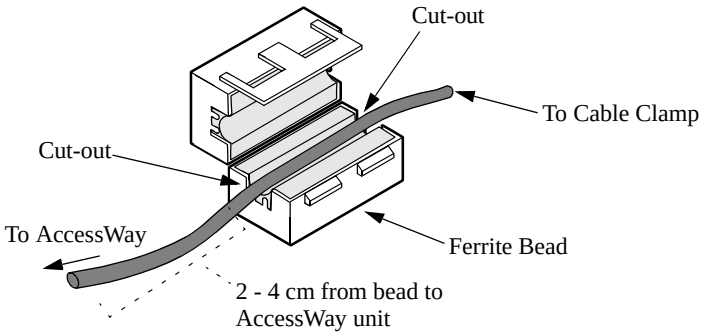
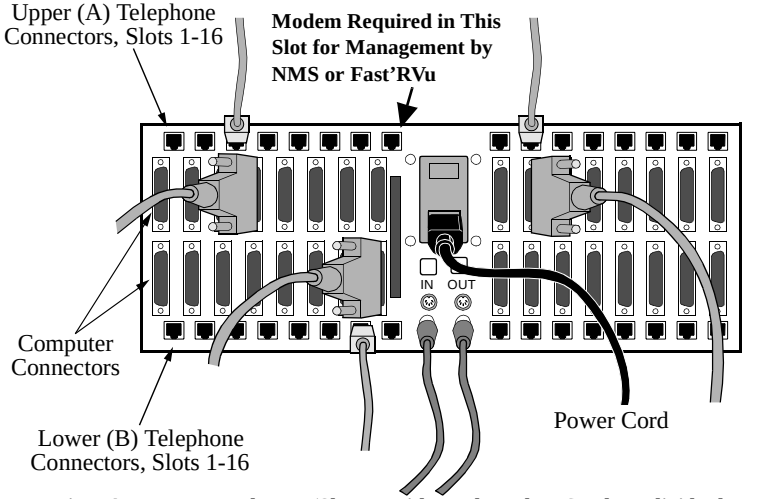


Figure 1-7. Ferrite Bead Installation


Upper (A) Telephone Connectors, Slots 1-16
Modem Required in This Slot for Management by NMS or Fast'RVu
IN
OUT
Computer Connectors
Lower (B) Telephone Connectors, Slots 1-16
Power Cord

Rear View, AccessWay Enclosure (Shown With Dual-Modem Cards, Individual RJ-11 Connectors, and AC Power)

Figure 1-8. Cabling an AccessWay Enclosure

Cabling One or More Enclosures to a Computer

You can connect up to four enclosures together and use Fast'RVu to manage all the modems.

Cabling Enclosures Together for Fast'RVu

Step	*Action*
1.	Ensure that enclosures are securely installed in equipment racks.
2.	Assign addresses to enclosures by setting the DIP switch on each enclosure rear panel. Refer to Table 1-3.
3.	Cable the enclosures' NM OUT (or NC OUT) and NM IN (NC IN) connectors together (Figure 1-9).
4.	Cable a computer's serial communications (COM) port to the first enclosure's NM IN connector.
5.	Refer to Chapter 4 for instructions on using Fast'RVu.

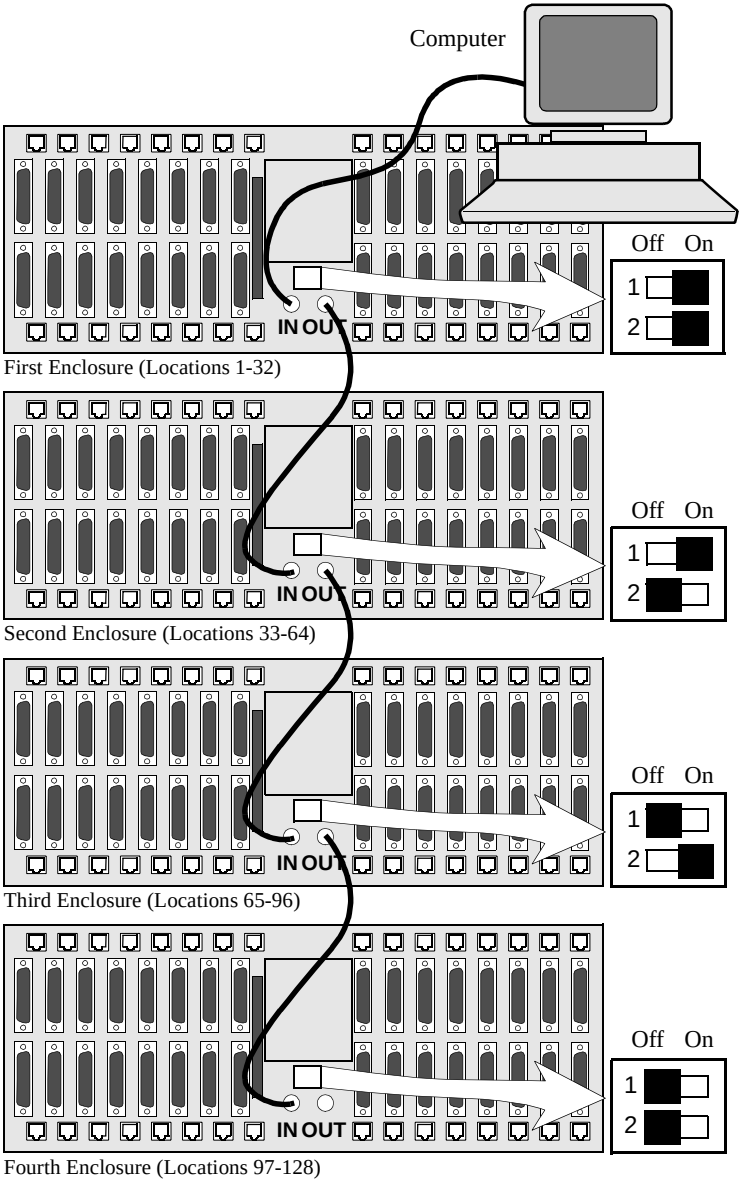


Figure 1-9. Cabling AccessWay Enclosures Together

Modem Addresses in Multiple-Enclosure Configurations

When you cable enclosures together, their modem slots are assigned the following addresses. Slot numbers and modem locations are marked on the enclosure rear panel. Set each enclosure to a *different* address.

Table 1-3. Modem Addresses in AccessWay Enclosure

The Enclosure With This DIP Setting (Fig. 1-9)...	*Has These Modem-Addresses...*	*Assigned to These Locations:*
DIPs =ON/ON	1 through 32	1 = Slot 1 Position A 2 = Slot 1 Position B 3 = Slot 2 Position A 4 = Slot 2 Position B . . . 32 = Slot 16 Position B
DIPs =ON/OFF	33 through 64	33 = Slot 1 Position A . . . 64 = Slot 16 Position B
DIPs =OFF/ON	65 through 96	65 = Slot 1 Position A . . . 96 = Slot 16 Position B
DIPs =OFF/OFF	97 through 128	97 = Slot 1 Position A . . . 128 = Slot 16 Position B
A single-modem card supports a two- or four-wire leased-line connection in Position A, or a dial-line connection in Position B.		

With Fast'RVu, select a modem in an AccessWay enclosure as follows.

1. In the Fast'RVu main window, select ENCLOSURE LOCATION.
2. In an option window, specify the modem location. Example: Select Enclosure (Nest) with DIPS at ON/ON; Slot 1; Position A; which is Modem Address **1**:

Installing/Removing Modem Cards

Installing a Modem Card

You can install 3460 Fast'R cards in an AccessWay while it is operating.

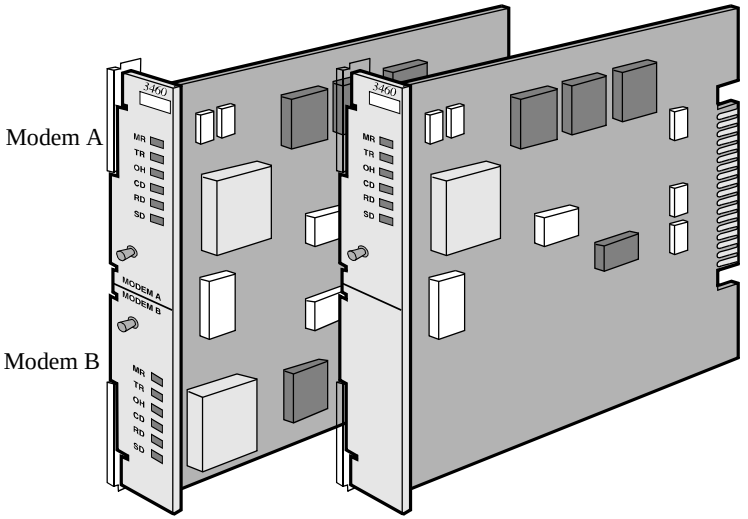


Figure 1-10. 3460 Fast'R Modem Cards

Installing a Modem Card in an AccessWay

Step	*Action*
1.	Loosen the enclosure front door screws. Open the door.
2.	Flip the modem card's ejector tabs (Figure 1-11) apart. Slide the card into a slot's guide rails. Press the tabs until it is seated firmly and the tabs are against the rail. Ensure that the card front panel is flush with the power module front panel.
3.	If you plan to use Fast'RVu or a Motorola network management system, install a card in **Slot 9**. A card *must be present in Slot 9* to transfer network control information to and from modems.

Installing a Modem Card in an AccessWay *(continued)*

Step	Action
4.	If your AccessWay has: • *Individual telephone cable connectors*, connect cables from the telephone service outlets to each modem connector. The upper connector serves: — Two- and four-wire leased line modems, on four-wire leased line cards — Modem A, on dual-modem cards The lower connector serves: — Dial-line connections, on four-wire leased line cards — Modem B, on dual-modem cards. • *Mass-termination connectors*, you should have two multi-line cables from the telephone service outlets to the two mass-termination connectors on the AccessWay rear panel, already connected. • **Note**: Mass-termination is not compatible with the two- or four-wire leased-line/dial-line modem card. The upper connector serves Modem A on dual-modem cards. The lower connector serves Modem B on dual-modem cards. Refer to the *3460 Fast'R Reference Guide* for cable pin-outs.
5.	A modem begins a self-test sequence when power is applied. A modem indicates test results as follows: • *Successful completion*: MR LED steady on. • *A problem* by setting LEDs in one of these ways: — MR: slowly blinking. TR: on. OH: off. CD: off. — MR: off. TR: on. OH: on. CD: on. You can also check self-test completion with Fast'RVu. Select **Status**, then select: • **EIA** to display DCD, DTR, DSR, CTS, and RTS signal states • **Device** to display rate and mode parameters that describe the modem's current state Note the LED pattern. Report any problem to Motorola Support.
6.	Connect a cable from a computer serial port to the appropriate Modem DTE connector on the enclosure rear panel.
7.	To configure modems for operation, go on to Chapter 2.

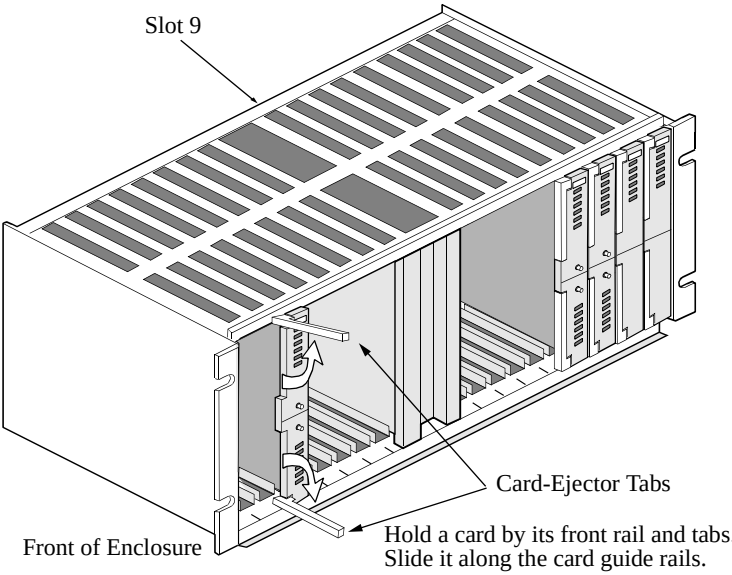


Figure 1-11. Installing a Modem Card in an AccessWay

Removing a Modem Card

You can remove modem cards from an AccessWay while it is operating.

Removing a Modem Card from an AccessWay

Step	*Action*
1.	Press the card ejector tabs apart (Figure 1-11).
2.	Hold the card by its edges. Slide it out along the guide rails.

Power Modules

This section provides basic information about AC and DC power modules for the AccessWay enclosure.

Warning

To avoid the possibility of electrical shock, remove the power cord before servicing the power module.

Avertissement

Pour éviter tout risque d'électrocution, débrancher le cordon électrique avant de réparer le module d'alimentation.

Warnung

Um möglichen elektrischen Schlag zu vermeiden, ist vor Wartungsarbeiten am Netzmodul das Stromkabel abzustecken.

AC Power Module

Refer to the *3460 Fast'R Reference Guide* for instructions on removing and servicing an AC power module.

Warning

This product employs double-pole/neutral fusing. When fuses are replaced, they must be replaced with fuses of the same type and rating.

Avertissement

Ce produit utilise des fusibles bipolaires/neutres. Lorsque les fusibles doivent être remplacés, ils doivent l'être par des fusibles de même type et de même calibre.

Warnung

Dieses Gerät verwendet zweipolige neutrale Absicherung. Beim Auswechseln der Sicherungen sind diese mit solchen des gleichen Typs und gleicher Leistung zu ersetzen.

DC Power Module

The AccessWay -48 VDC-powered enclosure provides:

- Optional independent dual DC power module operation
- Optional independent dual DC power source connections
- Relay contacts for connection to an alarm monitoring device

Connecting to DC Power Supply

You may connect the AccessWay to a single DC power source, or to two separate sources (to enable the AccessWay to continue operating if one power source fails).

Connecting the AccessWay to DC Power Supply

Step	*Action*
1.	Obtain wire that is rated AWG 20, stranded, 300 V insulation.
2.	Optionally: remove the AccessWay power terminal block from its connector on the rear of the AccessWay unit. It is easier to work with the block when it is removed.
3.	Strip several lengths of wire to 0.3" (7 mm) from the ends. Use them to make the following connections. Ttighten connectors so they are snug.
4.	**Caution** Ensure that the DC power source is turned off before making connections. To operate with **single or dual DC** battery or power source, connect: a) The AccessWay VA terminal to the battery's - (negative) terminal b) One AccessWay COM terminal to the battery's + (positive) terminal c) The AccessWay CH GND terminal to frame ground
5.	For operation with **dual DC** battery or power sources, connect: a) The AccessWay VB terminal to the second battery's - (negative) terminal b) The remaining COM terminal to the second battery's + (positive) terminal

Connecting the AccessWay to DC Power Supply *(continued)*

Step	*Action*
6.	Optionally, connect a remote alarm monitoring device to the AccessWay, to alert you to a fault in the DC output voltage. a) Determine whether you want the alarm relay contacts open or closed when AccessWay output voltages are within normal operating range. The default setting is Normal Open. b) Optionally, reverse this setting: at the front of the AccessWay, loosen a power module's captive screws and pull the power module out of the AccessWay. Set the jumper to the Normal Closed position (Figure 1-12). Replace the power module in the AccessWay. Tighten the captive screws that secure it. c) Connect two lengths of wire from the alarm monitor device terminals to the ALARM 1 terminals on the back of the AccessWay.
7.	If you disconnected the power terminal block from the rear of the AccessWay unit, replace it.
8.	Attach the cable clamp (Figure 1-13; provided with the AccessWay) to the wire bundle at the rear of the AccessWay. Leave a service loop of at least 8 cm between the clamp and the terminal block, and secure the clamp to the screw at the left of the terminal block. Ensure that any strain is relieved from the cable terminals, and that the power terminal block is easily accessible should you need to remove it quickly in an emergency.
9.	Apply DC power to the AccessWay. Verify that the LEDs near the bottom of the power module(s) are lit. The LEDs indicate the presence of input voltage and the status of output voltage.

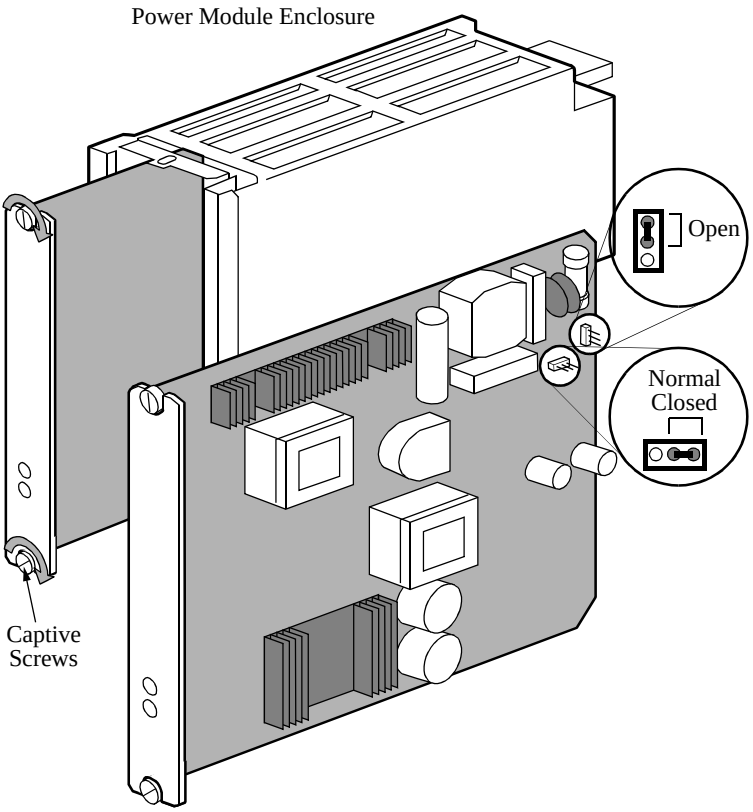


Figure 1-12. Power Module Alarm Circuit Switches

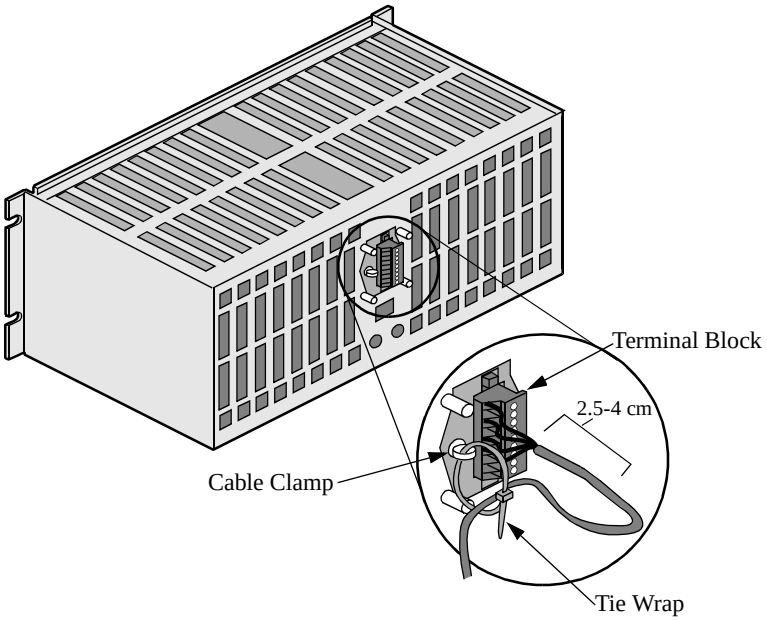


Figure 1-13. AccessWay Terminal Block and Cable Support

Tip for Power Module Setup

When equipping an AccessWay that has two power modules for remote alarm monitoring, you may attach the power modules to separate alarm monitor devices.

Installing a Second DC Power Module

You can install a second DC power module, while the AccessWay is operating, as follows.

Installing a Second DC Power Module

Step	*Action*
1.	 **Warning** The AccessWay enclosure power module should be installed and removed *only* by a trained service person. **Avertissement** Le module d'alimentation électrique de l'enceinte AccessWay doit être installé et retiré par un réparateur expérimenté. **Warnung** Ein- und Ausbau des AccessWay Schaltschranks ist von einem geschulten Wartungstechniker vorzunehmen.
2.	Remove the blank panel that covers the right power module slot by loosening the screws at the top and bottom (Figure 1-14).
3.	Slide the second power module into the right AccessWay power module slot. Ensure that its front rail is flush with the adjacent power module rail. Tighten the power module screws.
4.	Optionally, connect a remote alarm monitoring device to the AccessWay ALARM 2 terminals, to alert you to a fault in the DC output voltage. To do so, refer to the "Connecting the AccessWay to DC Power Supply" section on page 1-25.
5.	Verify that the LEDs on the power modules are lit. The LEDs indicate the presence of input voltage and the status of output voltage.

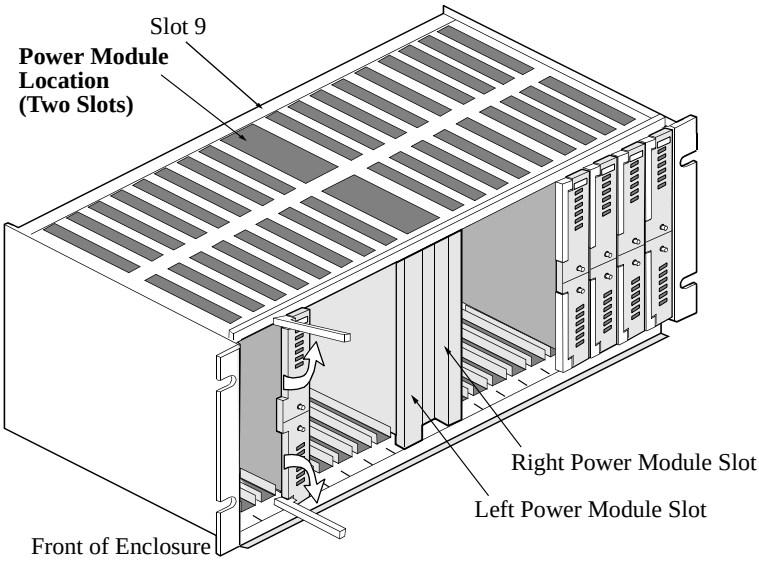


Figure 1-14. Dual DC Power Module Locations

Installing a Modem Daughtercard, Vanguard Enclosure

The Vanguard 3460 V.34 Daughtercard card operates in Vanguard enclosures. For instructions on installing and removing Vanguard Daughtercards, refer to the *Vanguard Daughtercard Installation Guide* (Part. No. T0020-02).

IMPORTANT: *When using a network-management application, such as Fast'RVu, with Vanguard 3460 V.34 Daughtercards, always assign the address* ***Enclosure 1, Slot 9, Modem B*** *to the daughtercard.*

The daughtercard always presents itself as a master modem in Slot 9 to the network-management application, regardless of its location.

Set-Up

The Vanguard 3460 V.34 Daughtercard default option set uses an asynchronous protocol. However, the 3460 Daughtercard does not have a computer port, so it cannot be cabled directly to a personal computer.

To configure the 3460 Daughtercard, the preferred method is to connect a personal computer to the modem card network-management port, and use Fast'RVu to set options. Or, to configure for async applications only, set the modem's Pass Through option. To do this, establish a call from one Vanguard port (e.g., a CTP or PAD) to the 3460 Vanguard daughtercard port, and echo AT commands through to the modem.

Chapter 2
Basic Modem Setup

Introduction

To operate the modem using mostly pre-configured options (an **option set**), follow the instructions here. To set advanced options, follow the instructions in the next chapter.

Before You Start

To get started, you'll need:

- A computer, cabled to the modem
- A communications program, which may be:
  - — A general-purpose program to set fax options and dial into an on-line service, using asynchronous (async) protocols
  - — A remote control program to operate a host computer or access a host network, using synchronous (sync) or async protocols

  (You do not need a communications program to configure a modem that has the four-button/LCD front panel.)

If you don't know which type of communications you'll use, check with your network administrator.

Vanguard Daughtercard Setup

The Vanguard 3460 V.34 Daughtercard's default option set uses an async protocol. However, the 3460 Daughtercard does not have a computer port, so it cannot be cabled directly to a personal computer.

To configure the 3460 Daughtercard, connect a personal computer to the modem card network-management port, and use Fast'RVu to set options. Or, to configure for async applications only, set the modem's Pass Through option. To do this, establish a call from one Vanguard port (e.g., a CTP or PAD) to the 3460 Vanguard daughtercard port, and echo AT commands through to the modem.

Asynchronous Operation

Entering Commands to the Modem

If you use a communications program to enter commands: the commands shown here are typical AT commands, but communications-program command syntaxes vary, so use this procedure only as a guide.

If your modem has the four-button/LCD user interface, you can use the menu-tree commands to enter information. Refer to Appendix D for details.

Setting Up for Asynchronous (Dial) Operation

Basic Setup for Async Dial-Up Operation

Step	*Stage*
1.	Run a communications program. Assign the modem to one of the computer's serial communications (COM) ports.
2.	Optionally: store one or more telephone numbers in the modem. To enter a number, use this command: **AT&Zn,x<CR>** where **n** is a Phonebook location and **x** is the telephone number.
3.	Optionally, enter a default initialization string. Example: **AT&F&V1*EC1S0=1**
4.	Optionally: set security options. See the *3460 Fast'R Reference Guide*. Security options include: • Password Verification on Connection • Callback Verification and Dial Restriction • Configuration/Phone Number Access Restriction

Leased-Line Synchronous Operation

Set up a modem for leased line operation with a synchronous protocol as follows. Using a special remote control program to operate a host computer or access a host network usually requires a synchronous protocol. Communications-program commands vary, so use this procedure only as a guide.

Basic Setup for Sync Leased-Line Operation

Step	*Stage*
1.	Run your communications program. Assign the modem to one of the computer's serial communications (COM) ports.
2.	The modem is pre-set to Option Set **1**. To set it to Option Set **2**, run your communications program, and issue the ATZ2 command.
3.	For information on setting custom configuration options, refer to Chapter 3, Advanced Modem Setup.

Fax Setup on Windows

To use the modem's fax functions, you must logically install the modem. This procedure assumes the modem is already functional for non-fax data, and that Release 4.0 software is installed in the modem. You can download Release 4.0 from the Motorola website.

This procedure is for Windows. For Macintosh computers, set up the fax application for a generic Class 1 or Class 2.0 modem.

Installing a Modem on a Windows Computer

Step	*Stage*
1)	Use a web browser to connect to the the Motorola Transmission Products page: http://www.mot.com/networking/products/tran.html Download the **3460.inf** file to your computer.
2)	In Windows, open the Modems Control Panel. In the Modems Properties window, select Add. Follow the directions that appear, and select: • In the Install New Modem window, select "Don't detect my modem; I will install it from a list." • In the Install New Modem window, select "Have Disk;" browse to the location where you stored the 3460.inf file. • In the Install New Modem window, highlight Motorola under Manufacturers, and 3460 Fast'R under Models. • In the Install New Modem window, select the communications (COM) port to which the modem cable is attached.
3)	Windows installs the modem.
4)	In the Dialing Properties window, enter your telephone information.

Installing a Modem on a Windows Computer

Step	*Stage*
5)	Install and run a fax application. Enter your User Setup/Branding information to comply with country communications regulations (Appendix A). If the application requires it, specify that the 3460 Fast'R Modem is the active modem, and whether to use it as a Class 1 or Class 2.0 modem. (Most fax servers require Class 2.0.) Optionally: set other fax modem parameters.
6)	Optionally, send a test fax. If there is a problem, refer to the Frequently Asked Questions on the Motorola ING Support web page: http://www.mot.com/networking/support/faqs/

Chapter 3
Advanced Modem Setup

Vanguard Daughtercard Setup

The Vanguard 3460 V.34 Daughtercard's default option set uses an async protocol. However, the 3460 Daughtercard does not have a computer port, so it cannot be cabled directly to a personal computer.

To configure the 3460 Daughtercard, connect a personal computer to the modem card network-management port, and use Fast'RVu to set options. Or, to configure for async applications only, set the modem's Pass Through option. To do this, establish a call from one Vanguard port (e.g., a CTP or PAD) to the 3460 Vanguard daughtercard port, and echo AT commands through to the modem.

Modem Configuration and Commands

What is the Configuration?

The modem configuration is the complete current set of parameter options, which tell the modem how to function. For example, the **Modulation Mode** parameter options specify which mode is used in data transmission—option 0 for V.34 Auto, and so on.

The modem operates in accordance with:

- The current parameter options
- AT commands, entered from a computer with communications software
- Network-management commands, received from a Motorola NMS or Fast'RVu

AT and NMS commands can temporarily override configured options.

Issuing AT Commands

When the modem is in Command Mode or Escape Mode it accepts AT commands. The modes are similar, but:

- In Command Mode, the modem is not connected to a remote modem
- In Escape Mode, the modem is connected to a remote modem

Communication between the computer and the modem requires a common command interface, such as the AT command set. Typically, you use communications software on the computer, such as HyperTerminal, and the modem uses its Automatic Calling Interface (ACU).

AT commands consist of the letters **AT** followed by characters and symbols. (The **A/** and **+++** commands do not include the letters AT.)

Issuing Network Management Commands

You enter network management commands from network management software. The 3460 Fast'R modem accepts commands from:

- Motorola Fast'RVu software (see Chapter 4)
- Motorola 9000 NMS software (see NMS documentation)

What Are Option Sets?

Option sets are predefined configurations. The modem comes with two option sets. You can either:

- Operate the modem with one of these option sets
- Build on an option set with custom options

Option sets do not include such site-specific parameters as telephone numbers, which you must enter and save.

Managing Option Sets

The modem is pre-set with Option Set 1 as the active configuration.

- For asynchronous application protocols, build on Option Set **1** with any custom or site-specific parameter options
- For synchronous and leased-line application protocols, build on Option Set **2** with any custom or site-specific parameter options

Select *one of the following procedures* to customize an option set. The AT commands you need are listed in Table 3-1 and Table 3-2.

Selecting and Customizing Option Set 1

Manage an asynchronous modem configuration as follows.

Configuring a Modem for Async Operation

Step	*Stage*
1.	Issue the ATZ1 command[1] to load Option Set 1.
2.	Optionally, set custom parameter options.
3.	If you set any options in Step 2, issue the AT&W1 command to save the configuration as Option Set 1. (Refer to Table 3-1.)
4.	Issue the AT&Y1 command to make the modem use Option Set 1 at subsequent power-ups. Option Set 1 is active.

[1]You can set options and issue commands in either of these ways:

• By issuing AT commands through a communications application

• With Fast'RVu (see Chapter 4)

Fast'RVu is especially useful for copying configurations to multiple modems.

Selecting and Customizing Option Set 2

Manage a leased-line synchronous modem configuration as follows.

Configuring a Modem for Leased-Line Sync Operation

Step	*Stage*
1.	Issue the ATZ2 command to load Option Set 2 (if it is not already active).
2.	Press the Off-line Configuration (OLC) button for three seconds. The modem loads factory-default Option Set 1 to active memory and enters command mode.
3.	Issue the ATZ2 command to permit changes to Option Set 2. (The AT ACU remains active so that you can modify the configuration.)
4.	Optionally, set custom parameter options by issuing AT commands. (Table 3-1.)
5.	If you set any options in the previous step, issue the AT&W2 command to save the custom configuration as Option Set 2.
6.	Issue the AT&Y2 command to make the modem use Option Set 2 at subsequent power-ups.
7.	Press the OLC button for three seconds. The modem loads Option Set 2 into active memory and exits command mode. Option Set 2 is in effect.

Option-Set Parameter Default Options

This section lists the pre-configured option-set parameter options.

Table 3-1. Option-Set Default Options

	Pre-Configured Default Option	
Command	***Option Set 1 (Asynchronous)***	***Option Set 2 (Synchronous)***
Async Echo	ATE1=On	ATE1=On[1]
Result Code	ATQ0=Enable	ATQ0=Enable[1]
Result Form	ATV1=Verbose	ATV1=Verbose[1]
Longspace Disconnect	ATY1=On	ATY0=Off
DCD Control	AT&C0=High	AT&C1=Normal
DTR Control	AT&D2=Disconnect	**AT&D0=High**
Line	AT&L0=Dial	AT&L1=2W Lease
AT Form	AT&M0=Async	AT&M1=Sync Data[1]
CTS Control	AT&R0=Async/Sync	AT&R1=Normal
Remote Access	AT&RA1=On	AT&RA1=On
DSR Control	AT&S0=High	AT&S1=Normal
Clock	AT&X0=Internal	AT&X0=Internal
ACU Protocol	AT*AC1= AT	AT*AC0=None
Adaptive Rate	AT*AP1=On	AT*AP1=On
V.34 Asymmetric Rate	AT*AR1=On	AT*AR1=On
Answer Restoral	AT*AS0=LL FAIL	AT*AS0=LL FAIL
Break Handling	AT*BK0=Destructive	AT*BK0=Destructive[1]
Mode	AT*CA0=Orig	AT*CA0=Orig
Direct Mode Async Character Length	AT*CL2=10 bits	AT*CL2=10 bits
Connect Message	AT*CM0=DTE Rate	AT*CM0=DTE Rate[1]
Default Dial	AT*DA0=Off	AT*DA0=Off[1]
DTE (Terminal) Rate	AT*DE23=Auto	AT*DE23=Auto
Lease to Dial Threshold	AT*DI0=Low/Fast	AT*DI0=Low/Fast

Parameters and options shown shaded gray vary by country. For details, refer to Appendix B of the *3460 Fast'R Reference Guide*.

[1]Parameter option does not affect normal operation.

Table 3-1. Option-Set Default Options *(continued)*

Command	Pre-Configured Default Option: Option Set 1 (Asynchronous)	Pre-Configured Default Option: Option Set 2 (Synchronous)
Hold Dial Line	AT*HD0=Off	AT*HD0=Off
Dial to Lease Threshold	AT*LE0=Off	AT*LE0=Off
DTR Delay	ATS25=5	ATS25=5
Flow Control	AT*FL3=RTS/CTS	AT*FL3=RTS/CTS[1]
Low Speed	AT*LS0=Bell	AT*LS0=Bell
PSTN Signaling	AT∗MD1=On	AT∗MD1=On
Modulation Mode	AT∗MM0=V.34 Auto	AT∗MM0=V.34 Auto
Minimum Rate	AT∗MN1=300	AT∗MN1=300
AT Message	AT∗MS1=Before CD	AT∗MS1=Before CD
Maximum Rate	AT∗MX17=33.6	AT∗MX17=33.6
Overspeed	AT∗OS0=1%	AT∗OS0=1%
Parity	AT∗RP0=V.25[1]	AT∗RP0=V.25[1]
Restoral Initiation/ Termination	AT∗REn=Off	AT∗REn=Off
Restoral Auto-Redial	AT*RR0=Disable	AT*RR0=Disable
RTS Control	AT∗RS1=High	AT∗RS0=Normal
Retrains	AT∗RT2=High BER	AT∗RT2=High BER
Test Restoral	AT*TR0=Off	AT*TR0=Off
Data Transfer Mode	AT∗SM3=Auto-Reliable	AT∗SM0=Direct
Reliable Message	AT∗XC2=Off	AT∗XC0=Off[1]
EC	AT∗EC0=V.42	AT∗EC0=V.42[1]
DC	AT∗DC1=On	AT∗DC1=On[1]
Delay Disconnect	AT∗DB0=Off	AT∗DB0=Off[1]
No ACU Form	AT∗DM0=Async[1]	AT∗DM1=Sync
V.25 Character	AT∗VC0=ASCII[1]	AT∗VC0=ASCII[1]
V.25 Form	AT∗VF0=Bitsync[1]	AT∗VF0=Bitsync[1]

Parameters and options shown shaded gray vary by country. For details, refer to Appendix B of the *3460 Fast'R Reference Guide*.

[1]Parameter option does not affect normal operation.

***Table 3-1. Option-Set Default Options** (continued)*

Command	Pre-Configured Default Option: Option Set 1 (Asynchronous)	Pre-Configured Default Option: Option Set 2 (Synchronous)
Sync Idle	AT∗V11=Char[1]	AT∗V11=Char[1]
V.25 Response	AT∗VR1=V.25bis[1]	AT∗VR1=V.25bis[1]

Parameters and options shown shaded gray vary by country. For details, refer to Appendix B of the *3460 Fast'R Reference Guide*.

[1]Parameter option does not affect normal operation.

AT Commands for Modem Tasks

Table 3-2. AT Commands to Manage Option Sets

To...	Enter This Command:
Load Option Set **1** into modem memory	ATZ0 or ATZ1
Load Option Set **2** into modem memory	ATZ2
Specify that the modem loads Option Set **1** into memory at subsequent power-ups	AT&Y1
Specify that the modem loads Option Set **2** into memory at subsequent power-ups	AT&Y2
Specify that the modem loads the last-saved option set (AT&W) at subsequent power-ups	AT&Y0
Save the active configuration into Option Set **1**	AT&W0 or AT&W1
Save the active configuration into Option Set **2**	AT&W2

AT Action Commands

AT commands for performing basic functions are as follows.

Table 3-3. AT "Action" Commands

Command & Option	Description
+++	Enter Local Escape Mode
#####	Enter Remote Escape Mode
A/	Re-Execute Last Command

*The contents of the following S-registers are *not* automatically saved when power is removed: 0, 1, 2, 3, 4, 5, 41, 42. To retain values, save them to an option set. (S-Registers are storage areas for some parameter options.)

***Table 3-3. AT "Action" Commands** (continued)*

Command & Option	*Description*
ATSn=*x*	Change S-Register n to Value *x**
ATS*n*?	Display S-Register Value (*n*=register)
AT	Attention Code
ATA	Manual Answer
ATD*x*	Dial Phone Number *x*
ATDS*n*,	Dial From Phone Book Number=*n* *n* is Phone Book entry
AT∗RD*n*,	Redial Last Telephone Number *n* times.

*The contents of the following S-registers are *not* automatically saved when power is removed: 0, 1, 2, 3, 4, 5, 41, 42. To retain values, save them to an option set. (S-Registers are storage areas for some parameter options.)

Dial Modifiers

The following table shows the symbols used in dial strings.

Table 3-4. Dial Modifiers

Modifier	*Description*
W/w/:	Dial Wait
K/k/</,	Pause Delay
P/p	Pulse
T/t	Tone
&/!	Flash
;	Return to command state after dialing
@	Quiet Answer
R	Reverse
H/h	Disconnect
(space) . (period) - (dash) () (parentheses)	Presentation characters

Non-Option Set Parameters

This section describes parameters that are independent of the option set selected. Determine whether the default options are correct for your site, and set parameters as needed.

Table 3-5. Site-Specific Parameters

Parameter	*Default Option*	*Available Option*
Test Options		
Accept RDL	AT&T4=On	AT&T5=Off
Modulation Options		
Guard Tone	*Country-specific*	AT&G0=Off AT&G1=550 AT&G2=1800
EC/DC Options		
Buffers	AT∗NB0=Regular	AT∗NB1=Reduced
Automatic Call Unit (ACU) Options		
Call Progress		ATX0=Modem uses only NO CARRIER and CONNECT result codes. ATX1=Modem uses only NO CARRIER, CONNECT, and CONNECT <Rate> result codes. ATX2=Modem waits for dial tone and uses only NO CARRIER, CONNECT, CONNECT <Rate> and NO DIALTONE result codes. ATX3=Modem detects busy signal and uses only NO CARRIER, CONNECT, CONNECT <Rate>, and BUSY result codes.

Table 3-5. Site-Specific Parameters *(continued)*

Parameter	*Default Option*	*Available Option*
		ATX4=Modem waits for dial tone and detects busy signal. Uses only NO CARRIER, CONNECT, CONNECT <Rate>, BUSY, and NO DIAL TONE result codes.
Terminal Options		
Terminal Inactivity Disconnect	*Country-specific*	S30=*n*; *n*=0-255 sec.
DCD Loss Disconnect	*Country-specific*	S10=*n*; *n*=1-255 sec.
Telco or Telco Jack Options		
DL TX Level (dB)	*Country-specific*	AT∗DX0 - AT∗DX30
LL Tx Level (dB)	*Country-specific*	AT∗LX0 - AT∗LX30
Speaker Control	ATM1=Dialing	ATM0=Always Off
		ATM2=Always On
		ATM3=On During Training
Speaker Volume	ATL2=Medium	ATL0 or ATL1=Soft
		ATL3=Loud
Dial Line Filter	AT*LF2=Short	AT*LF0=Long
		AT*LF1=Medium
		AT*LF2=Short
		AT*LF3=Not recommended
Dialing Options		
Pause Delay	*Country-specific*	ATS8=*n*; *n*=value
Dial Wait	*Country-specific*	AT∗DD0 - AT∗DD9
Dial Mode	*Country-specific*	AT∗PT0 - AT∗PT2
Call Timeout	*Country-specific*	AT∗TT0 - AT∗TT5
Blind Dial	*Country-specific*	ATS6
Pulse Cycle	*Country-specific*	AT&P0 - AT&P2
Tone Length	*Country-specific*	ATS11
Auto Redial	*Country-specific*	AT∗DR0 - AT∗DR15

Table 3-5. Site-Specific Parameters *(continued)*

Parameter	*Default Option*	*Available Option*
Phone Book	*[Blank]*	AT&Z=*n*; *n*=1-4.
		Storage for telephone strings, to 40 characters.
Access Security Options		
Callback Phone Number Source	AT∗ZC0=Off	AT∗ZC*n*=Phonebook index *n*; *n*=1-4
		AT∗ZC5=Network manager
		AT∗ZC10=Remote dial string
		AT∗ZC12=Remote modem's Phonebook index
Dial Restrict	AT∗ZD0 =Off	AT∗ZD1=Level 1
		AT∗ZD2=Level 2
Password Verification	AT∗ZV0=Disable	AT∗ZV1=Internal
Remote Number Required	AT∗ZR0=Off	AT∗ZR1=On
Group Password	AT∗Z1*password*	AT∗Z1*password*
Remote Configuration Options		
Remote Access	AT∗RA1 (Enable)	AT∗RA1 (Enable)
Option Set Options		
Load Set at Power-Up	AT&Y0= Last-loaded set	AT&Y1=Set 1
		AT&Y2=Set 2
Load Option Set	ATZ0 or ATZ1= Set 1	ATZ2=Set 2
Restoral Options		
Answer Restoral	AT*AS0=LL Fail	AT*AS1=Always
Lease to Dial Threshold	AT*DI0=Low/Fast	AT*DI1=Low/Slow
		AT*DI2=High/Fast
		AT*DI3=High/Slow
		AT*DI4=Immediate
Hold Dial Line	AT*HD0=Off	AT*HD1=1 minute
		AT*HD2=2 minutes

Table 3-5. Site-Specific Parameters *(continued)*

Parameter	*Default Option*	*Available Option*
		AT*HD3=3 minutes
		AT*HD4=4 minutes
		AT*HD5=5 minutes
Dial to Lease Threshold	AT*LE0=Off	AT*LE1=15 minutes
		AT*LE2=30 minutes
		AT*LE3=1 hour
		AT*LE4=2 hours
		AT*LE5=4 hours
Restoral Initiation/ Termination	AT*RE0=Disable	AT*RE0=Disable
		AT*RE1=NM/Fast'RVu Only
		AT*RE2=NM/Fast'RVu/ DTR
		AT*RE3=NM/Fast'RVu/ DTR/ACU
		AT*RE4=NM/Fast'RVu/ Auto
Restoral Auto-Redial	AT*RR0=Disable	AT*RR1=Enable
Test Restoral	AT*TR0=Off	AT*TR1=Daily
		AT*TR2=Weekly
		AT*TR3=Monthly
Other Options		
Display Information	[None]	AT&I0=Part Number
		AT&I1=Country Code
		AT&I2=Product Code
		AT&I3=NC Address
		AT&I4=Serial Number

Access Security Functions

Password Verification on Connection

Password verification applies to incoming calls. With password verification, the answering modem must receive a password from the calling device, then validate it internally or send it to a Motorola network-management system (NMS) for validation, in order to complete the connection. If a password is invalid, the modem disconnects.

Enabling Password Verification by a Local Modem

Step	*Stage*
1.	Use the AT∗ZI command to enter a password in the local modem.
2.	Use the AT∗ZV1 command to enable internal password verification in the local modem.
3.	Use the AT∗ZI command to enter a password in a remote modem.
4.	Use the AT∗ZV1 command to enable internal password verification in the remote modem.

Callback verification and restriction apply to incoming calls.

With callback verification, the answering modem that successfully completes password verification with a calling modem hangs up, then calls the modem back. The modems then pass data.

With callback dial restriction, the answering modem calls back only stored Phonebook numbers, not numbers sent by a calling modem.

Enabling Callback Verification and Dial Restriction

Step	*Stage*
1.	Configure password verification, as described above.
2.	Use the AT∗ZC command* in the local modem to specify the callback phone number source: • The local modem (AT∗ZC*n*, where *n* indicates which Phonebook entry to call) • The remote modem (AT∗ZC10). This option does not use the secondary channel.
*ZC parameter default value is Off (AT*ZC0).	

Enabling Callback Verification and Dial Restriction

Step	*Stage*
3.	Store a callback telephone number in the device selected in the previous step, using the AT&Z (Enter Phone Number) command there.
4.	If you selected the remote modem as the callback-number source, use the AT∗ZR command to specify whether supplying the number is mandatory (AT∗ZR1) or optional (AT∗ZR0). With the Mandatory option, the remote modem must supply a callback number during its initial call, or the local modem disconnects and does not make a callback. With the Optional option, the remote modem may establish a call without supplying a callback number. The local modem does not disconnect.
5.	To prevent the local modem from executing an Auto Redial command, issue the AT∗ZD1 command. To prevent the modem from calling any number except those stored in the Phonebook, issue the AT∗ZD1 command.
*ZC parameter default value is Off (AT*ZC0).	

Configuration and Phone Number Access Restriction

Configuration and Phone Number Access Restriction apply to a local modem. With this function enabled, you must enter a correct password before performing the following operations:

- Listing, echoing, or storing Phonebook entries
- Changing configuration options

You do not need to enter the password to perform these functions:

- Dial a stored Phonebook number
- Answer an incoming call

After storing a password in a modem, enable configuration and phone number access restriction by issuing the AT∗PF command to lock it. A summary of access security commands follows.

IMPORTANT: *Know your password before enabling password functions. If you cannot remember the password, the only way to regain access to all modem actions is to re-initialize the modem memory (AT&F command). Once you re-initialize modem memory, you must re-enter Phonebook information and reconfigure option settings.*

Outbound Dial Restriction

With outbound dial restriction, the modem disables one or both of the Re-Execute Last Command (AT/) and Redial Last Number (AT*RD) commands.

Quiet Answer

With quiet answer, the answering modem does not send a tone when it connects to a call.

Access Security AT Command Summary

Security parameters and factory-default option settings are as follows.

Table 3-6. Security Parameters, Default Options

Command	*Default Option*	*Description*
AT∗PE	**AT∗PE0 (Disabled)**	Password protection
AT∗PF	**(None)**	Set Configuration and Phone Number password-protection
AT∗PN	**0000**	**Enter password. Issue AT*PN*x***, where ***x*** is a valid password, to access password-protected options.
AT∗PW	**0000/*x***	**Change password. Issue AT∗*x/y***, where ***x***=old password and **y**=new password, to specify new password.
AT∗ZC	**AT∗ZC0 (Off)**	Callback function.
AT∗ZD	**AT∗ZD0 (Off)**	Dial Restriction function.
AT∗ZI	**[None]**	**AT∗ZI*x; x*=**[Group password]
AT∗ZR	**AT∗ZR0 (Off)**	Remote Callback Number Not Required
AT∗ZV	**AT∗ZV0 (Disabled)**	Password Verification

Configuring a Remote Modem (AT*RA)

You can set remote-modem parameter options and view remote-modem status from a local 3460 Fast'R with the AT*RA command. With this function, you can:

- Set up remote modems from a central network administration facility
- Monitor remote operation
- Troubleshoot remote-modem application problems

Remote configuration with AT*RA uses the main data channel, temporarily halting data transmission. It is not available when either modem is in direct (AT*SM0), synchronous, or leased line mode.

Initiate a remote-configuration session from a local modem, using a communications application, as follows. Both modems must be set to the RA1 option.

Running a Remote Configuration Session

Step	*Stage*
1.	Establish a connection with the remote modem. Motorola recommends using a Reliable connection (AT*SM2 or AT*SM3)
2.	Enter the remote-escape command to place the remote modem in escape mode. The remote-escape command sequence is: guard time (AT&G, S-Register 42), remote-escape character sequence (S-Register 41), guard time. The remote modem responds: RC ESTABLISHED.
3.	If the remote modem has password security (AT*PE) enabled, enter the password: AT*ZI*password*.
4.	Enter configuration or status commands. Example: AT&V returns long-form status information.
The following commands are not supported in remote configuration mode: ATA, AT&T, ATD, ATH, action commands.	

Running a Remote Configuration Session *(continued)*

Step	*Stage*
5.	Optionally, end the remote-configuration session without saving changes by entering AT*RQ. The remote modem responds: RC ABORTED Configuration changes made during the session do not take effect until the session is ended.
6.	End the remote configuration session by entering either: • ATO0 - Return to data mode • ATO1 - Return to data mode and retrain The remote modem responds: RC COMPLETE Configuration changes made during the session are in effect.
The following commands are not supported in remote configuration mode: ATA, AT&T, ATD, ATH, action commands.	

Network Management (AT∗NE)

The 3460 Modem offers an in-band secondary channel for network management commands, so you can configure modems while data transmission continues.

Secondary channel mode functions only between 3460 Fast'R modems with Release 2.0 or higher software. It is not compatible with other Motorola modem secondary channel modes or competitor modem secondary channel modes.

The AT∗NE command controls secondary channel operation.

- Zero (0) enables the secondary channel. This is the default option.
- One (1) disables the secondary channel.

You can enable and disable the secondary channel through the AT ACU, Fast'RVu (Commands menu), or an NMS. The option is saved in non-volatile memory.

Secondary-channel communication is available when both modems are in the following modes:

- V.34 modulation mode (at any primary-channel data rate)
- V.32 modulation mode, except 4.8 KBPS
- Direct, Normal, V.42, MNP, and LAPM data modes, with or without data compression

Secondary-channel communication is not available during LAL, LAL pattern, and DBER tests.

Managing Remote Modems in an AccessWay Enclosure

Managing remote modems in an AccessWay enclosure requires the following setup and operation.

Managing Remote Modems

Step	*Stage*
1.	Ensure that a modem card is installed in **Slot 9**, position B (Figure 1-11). It is known as the master, and it transfers network-management commands to and from other modems in its enclosure through the enclosure backplane. **Note**: a master cannot transfer commands to and from modems in other local enclosures.
2.	Make a leased-line or dial-line connection from a local modem to a remote master modem.
3.	Ensure that the secondary channel is enabled (AT*NE1).
4.	Set the remote master modem's Pass Through (AT*NP) parameter to the appropriate option (NP options are described below).
5.	Issue NM commands to the other Accessway modems.

Pass Through Parameter (AT∗NP)

Pass Through options affect only dial connections. Pass Through options determine:

- How and whether a local modem passes network management commands to a remote modem
- How and whether a remote master modem passes network management commands to other modems connected to it by:
  - — Cables between their NM IN and NM OUT ports
  - — A shared backplane in an AccessWay enclosure

The Pass Through parameter uses the in-band secondary channel to pass network-management commands. Secondary-channel transmission is not disruptive of main channel data.

AT*NP Parameter Options

Option	*Description*
*NP0	A local modem, connected through its network control-in (NC IN) port to a local manager: • Passes *only the NC commands that are addressed to a remote modem* from its NC IN port to the in-band secondary channel • Passes only responses *that are addressed from a remote modem to the local manager* from the secondary channel to its NC OUT port. With this option, a remote modem receiving the local modem's commands does not pass them to its NC OUT port
*NP1	A local modem, connected through its network control In (NC IN) port to a local manager,: • Passes *only the NC commands that are addressed to the location (local address +100)* from its NC IN port to the in-band secondary channel • Passes only responses *that are addressed from a remote modem to the local manager* from the secondary channel to its NC OUT port.
*NP2	A local modem, connected through its network control-in (NC IN) port to a local manager, passes *all* NC commands to and from a remote modem, without filtering. The remote modem operates the same way.

Configuring Modems for Restoral

You can configure the modem to automatically respond to deteriorating leased-line conditions by switching operation to a back-up dial line.

For further details on the parameter options listed here, refer to the *3460 Fast'R Reference Guide* (part no. T0022).

If you normally operate the modem on a leased line, you can set the following options to enable it to switch operation to a backup dial line when conditions warrant. The following example shows the default options.

Parameter	*Option*	*Comment*
Answer Restoral	AT*AS0=LL Fail Answering modem:	When connected to the leased line, the modem answers a dial call only if the leased line fails. This parameter does not apply when AT*RE=0 (Off).
Lease to Dial Threshold	AT*DI1=Low/Fast	The originating modem uses this option to determine the threshold for initiating restoral. Low/Fast is the most sensitive option–if three retrains occur within five minutes, the modem initiates restoral.
Hold Dial Line	AT*HD0=Off	The originating modem uses the HD option to determine how to hold a dial connection while testing a leased line. **Off** means that the modem disconnects from the dial line as soon as it connects to the leased line. This parameter works only when the Initiate/Terminate Restoral parameter (*RE) is set to NM/Fast'RVu/Auto (option 4).

Parameters and options shown shaded gray vary by country. For details, refer to Appendix B of the *3460 Fast'R Reference Guide*.

Parameter	Option	Comment
Dial to Lease Threshold	AT*LE3=1 hour	The originating modem uses the LE option to determine when to disconnect from a dial line and return to leased-line operation.
Restoral Initiation/ Termination	AT*RE4=FP/Auto	The originating modem determines when to initiate restoral. The answer modem cannot automatically initiate restoral; it can only answer an inbound call, thus ensuring that both modems do not try to call each other at the same time (which would result in a failed restoral attempt).
Restoral Auto-Redial	AT*RR0=Disable	The RR option determines whether the originating modem can automatically redial, while in restoral, upon call failure or carrier loss. **Disable** prevents it from redialing.
Test Restoral *Country-specific*	AT*TR0=Off	The TR option specifies how often the modem checks for loop current on the dial line, to determine whether the line is available. **Off** disables testing.
Parameters and options shown shaded gray vary by country. For details, refer to Appendix B of the *3460 Fast'R Reference Guide*.		

Chapter 4
Fast'RVu

Introduction

Fast'RVu is a Windows application that helps you:

- View and set modem options without learning AT commands
- Check device, circuit, and signal status without special tools
- Copy configurations without leaving your keyboard
- Execute line and modem tests without scopes and meters
- Upgrade modem software

Fast'RVu is especially useful for installations of multiple modems, but it is not required for modem setup and operation.

Fast'RVu requires a computer with the Windows 95 or Windows NT operating system, and a 486DX2 or Pentium-class processor.

Fast'RVu is provided with AccessWay enclosures, and you can download it from the Transmission Products page of the Motorola website:

www.mot.com/networking/products/tran.html

Getting Started With Fast'RVu

Fast'RVu is provided on the 3460 Fast'R CD-ROM. Refer to the readme.txt file on the CD-ROM.

When you run Fast'RVu, its main window opens (Figure 4-1).

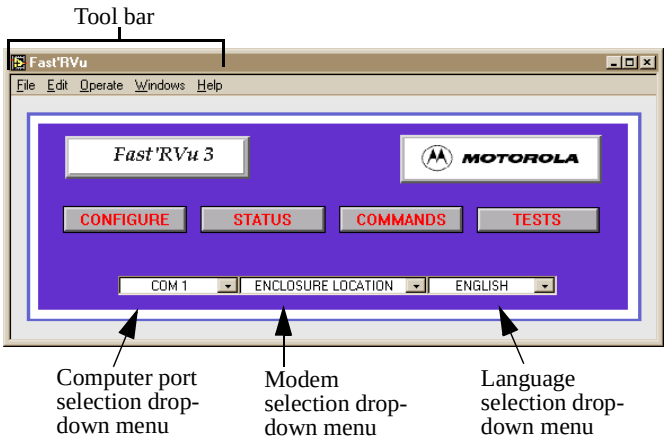


Figure 4-1. Fast'RVu Main Window

Closing Multiple Fast'RVu Windows

IMPORTANT: *As you work in Fast'RVu, you may open multiple Fast'RVu windows. To exit Fast'RVu, always close the current window (by clicking the RETURN button or the Close icon ( )), then any other Fast'RVu windows. If you close the Fast'RVU main window first (from the Windows Taskbar), you may find that, after Fast'RVu terminates, one or more subordinate Fast'RVu windows remain displayed. To close such a window, select* File...Exit, *or click the Close icon ( ).*

Language Options

You can set up Fast'RVu to display button text in any language.

Adding a Display Language to Fast'RVu

Step	*Action*
1.	Use a spreadsheet application or text editor to open the COUNTRY.TXT file in the fastrvu directory.
2.	Make a backup copy of the COUNTRY.TXT file.
3.	Obtain a translation for each term in the left column. Abbreviate terms, if necessary, so that they are ten characters or fewer.
4.	In the file, replace the second English prompt on each line with a new term, or add a new column to the right. Ensure that each new term is preceded by a TAB character. Do not replace the English terms in the left column.
5.	Save the COUNTRY.TXT file, in text-only format.
6.	Restart Fast'RVu. The new language option displays in the language-selection drop-down window.

Specifying a Modem in Fast'RVu

Specify a modem to access with Fast'RVu this way:

Specifying a Modem On Which to Operate Fast'RVu

Step	*Action*
1.	Connect a DIN-to-DB25 communications cable to a communications (COM) port on your computer, and to a stand-alone modem NM IN connector or an AccessWay NM IN connector. Optionally: connect multiple cables to devices; or cable multiple enclosures together (Chapter 1).
2.	Run Fast'RVu. The Fast'RVu main window displays (Figure 4-1). Optionally, select Show Help from the Help Menu or press CTL and H to display an information and instruction window.
3.	In the Fast'RVu main window, select the COM port to which the communications cable is connected on your computer.

Specifying a Modem On Which to Operate Fast'RVu

Step	*Action*
4.	In the Fast'RVu main window, select: • ENCLOSURE LOCATION to operate on: — A 3460 Fast'R in an AccessWay enclosure. — A Vanguard 3460 V.34 Daughtercard in a Vanguard enclosure. Fast'RVu addresses the Daughtercard as Enclosure 1, Slot 9, Modem B, regardless of its location. • MODEM ADDRESS to operate on a stand-alone modem
5.	In the Fast'RVu main window, select a language.
6.	In the Fast'RVu main window, select an option: • CONFIGURE, to view and set modem parameters • STATUS, to view current operating information • COMMANDS, to dial, get/set, copy, and so on • TESTS, to execute loopbacks and BER tests An option window displays.
7.	Optionally: to configure another modem (that isn't already cabled to the computer): disconnect a communications cable from a modem or enclosure, and connect it to another one. Repeat this procedure, starting with Step 3, to communicate with the modem. You can communicate with modems that are connected to the computer in the following ways: • A computer cabled to a stand-alone modem's NC connector • A computer cabled to AccessWay's NC connectors. The AccessWay may also be cabled to up to three other AccessWays • A computer cabled to a Vanguard enclosure's NC connectors. A Vanguard 3460 V.34 Daughtercard is installed in the Vanguard.

Useful Information

Table 4-1. Navigating and Initiating Actions in Fast'RVu

To...	*Do This:*
Display on-line help windows automatically, according to the mouse position	Press Ctrl and H or check Show Help on the Help menu
Select a modem	Stand-alone modem: 1) In the Fast'RVu main window, select MODEM ADDRESS. 2) In an option window, specify the modem address. Card modem in Accessway enclosure: 1) In the Fast'RVu main window, select ENCLOSURE (nest) LOCATION. 2) In an option window, specify the modem location. Daughtercard modem in Vanguard enclosure: 1) In the Fast'RVu main window, select ENCLOSURE (nest) LOCATION 1. 2) In an option window, specify the modem location Slot 9, Modem B.
Select an option or parameter	Select its label
Display current information	Select GET
Send a selected change to the modem	Select SET
Monitor fax status	Select Commands, Dialing, View or Status, Device. Note the Mode option. When the modem is transmitting/receiving a fax, this information is displayed.
Close a window	Select RETURN
Exit Fast'RVu	Select File > Close (or press CTL and W)
Adjust a parameter option	Click the parameter's selector arrows

Viewing and Setting Modem Options

To view or change modem parameter options, select CONFIGURE from the Fast'RVu window. Select an option type, then select an option.

Example: Setting Callback to Phonebook Entry 2

Step	*Action*
1.	In the Fast'RVu main window, specify a COM port and MODEM ADDRESS or ENCLOSURE LOCATION.
2.	Select CONFIGURE from the Fast'RVu main window. The Configuration Options window opens.
3.	Select the SECURITY type. The Security Options window opens.
4.	Select a modem—either a stand-alone modem by address, or a card modem by enclosure (nest), slot, and A/B.
5.	Select GET. The modem's current options display.
6.	In the Select New Options frame, click the arrows next to Callback until INTERNAL 2 displays.
7.	Select SET to save your change. The green OK icon displays.
8.	The parameter option is changed. When the local modem receives a call, it calls the number stored in Phonebook Entry 2.

Checking Device, Circuit, and Signal Status

To view modem parameter options, select STATUS from the Fast'RVu main window. Select a status type. Specify the modem address or location. Select GET.

Example: Checking Device Status

Step	*Action*
1.	Select STATUS from the Fast'RVu main window. The Status Options window opens.
2.	Select the DEVICE type. The Device Options window opens.
3.	Select a modem—either a stand-alone modem by address, or a card modem by enclosure (nest), slot, and A/B.
4.	Select GET. The modem device status information displays.*
*Fast'RVu automatically updates the status display until you select RETURN or select another modem.	

Entering Commands

To perform an action, select **COMMANDS** from the Fast'RVu main window, then select a submenu.

Table 4-2. Selecting Modem Commands

This Command Submenu...	*Lets You:*
DIALING	Enter telephone number; dial call; update Phonebook; link Phonebook entries; dial Phonebook entry
DISCONNECT	Disconnect a dial call
ASSIGN REMOTE	Assign an address to a remote modem.
UPGRADE	Upgrade the modem's operating software
GET SERIAL #	Get a modem serial number by entering its address
GET ADDRESS	Get a modem address by entering its serial number
SET ADDRESS	Change a modem's address **Caution** Changing the address of a card modem in an AccessWay enclosure is not recommended. Fast'RVu uses slot-A/B numbering (Table 1-3) to determine addresses. If you change an address, Fast'RVu may not be able to identify the modem.
SEARCH	Display modem serial numbers and addresses
REINIT MEMORY	Reset a modem to default configuration; load option set
OPTION SETS	Copy a configuration to an option set
POWER RESET	Power-up reset a modem
COPY CONFIG	Copy a configuration to or from a modem or a file
SECONDARY	Enable or disable a modem's secondary channel
RESTORAL	Monitor, initiate, terminate, and test restoral functions

Example: Copying a Configuration From One Modem to Another

Step	*Action*
1.	Select COMMANDS from the Fast'RVu window. The Command options window opens.
2.	Select COPY CONFIG from the Commands window. The Copy selection information displays.
3.	In the FUNCTION box, select a copy operation type.
4.	In the FROM Address box, select a modem configuration to copy.
5.	In the TO Address box, select a modem to which to copy the configuration.
6.	Click COPY. The configuration is copied to the specified modem.

Executing Line and Modem Tests

To execute a test of the telephone line quality or modem transmit/ receive paths, select TESTS from the Fast'RVu window. Select an option type, then select an option.

You can stop a test in progress by selecting END on the test window.

Example: Executing a Bit Error Rate (BER) Test

Step	*Action*
1.	Select TESTS from the Fast'RVu window. The Test Types window opens.
2.	Select the BER type. The BER Test window opens.
3.	In the NEST MODEM LOCATION/MODEM ADDRESS box, select a modem—either a stand-alone modem by address, or a card modem by enclosure (nest), slot, and A/B.
4.	In the TEST TIME boxes, select a testing interval. Example: 00 40 for a 40-second test.
5.	Click the START button to initiate the test. The STATE indicator changes to Active. When the test is complete, STATE changes to Inactive.

Using Fast'RVu to Communicate With a Remote Modem

Network Management Override

You can enable and disable a modem's responses to network management with the AT*NO parameter. The default option is 0 (disabled).

When this parameter is enabled, a modem ignores network management commands, except status requests.

When you connect to a modem that has Network Override enabled, Fast'RVu indicates this with the orange OR LED in its display.

Network Management Override Time-Out

A modem with this parameter enabled automatically returns its option to 0 (disabled) after 30 minutes with no AT ACU activity.

Downloading Modem Software

Modems support the use of Fast'RVu for software download through the NM IN port.

Downloading Modem Software with Fast'RVu

Step	*Action*
1.	Ensure that the new modem software is available on a drive connected to your computer. Make a note of the directory.
2.	Select COMMANDS from the Fast'RVu main window. The Commands window opens.
3.	Select UPGRADE. The Upgrade window opens.
4.	Enter one or more destination modem addresses. With some modems, you can specify multiple modems in AccessWay enclosures; refer to the Fast'RVu Help window. If you specify multiple modems, but Fast'RVu cannot upgrade them in multiples, an error message appears. In this case, go to Step 6.
5.	Select UPGRADE. Follow the instructions that appear. Note the progress messages in the STATUS and ACTIVITY LOG boxes.
6.	When the upgrade is complete, reconnect any cables that you disconnected. **Problems During a Download** If a download stops and you are unable to complete it, you can perform a manual download that does not use Fast'RVu. Refer to the *3460 Fast'R Software Download Instructions* (part no. T0022-09).

Chapter 5
Troubleshooting Problems and Improving Performance

Troubleshooting Steps

Take the following actions when the modem does not operate correctly.

Troubleshooting Steps

Step	*Action*
1.	For asynchronous applications only: confirm that your communications software is configured for the computer COM port to which the modem is connected. Example: COM1.
2.	On the modem and the computer, confirm that the communications port is configured for the data rate, character length, and parity your software requires. Confirm that both the modem and the computer support these options.
3.	Confirm that all cables are properly connected.
4.	If the preceding items are OK, locate the problem in the left column of Table 5-1. Test your diagnosis with the action in the second column. If the diagnosis is correct, take the action in the third column. If it is not correct, continue in the left column.
5.	If the problem is not resolved, refer to the refer to the 3460 Fast'R Modem Frequently Asked Questions page on the Motorola website.

Troubleshooting Actions

The following table provides troubleshooting actions and tips.

Table 5-1. Troubleshooting the 3460 Fast'R Modem

Problem	Diagnosis/Test	Possible Solution
INSTALLATION		
Modem won't power up	Check the power source and the modem power switch.	Ensure the outlet is active. Turn on the power switch.
Modem fails self test	Turn modem power off; wait 15 seconds; then turn power on.	Use the Return Procedures in this manual to return the modem to Motorola.
AUTOMATIC CALL UNIT (ACU) CONFIGURATION		
No response to ACU command	Use Fast'RVu or off-line configuration (OLC) button to check parameters. Check options: • DTE Rate (AT∗DE) • Form • Char Length • Parity (AT∗RP) • Result Code (ATQ)	Use Fast'RVu or off-line configuration (OLC) button to ensure ACU is compatible with modem configuration. Ensure that the computer is set to a valid character format to operate the modem's autobaud feature. If modem still does not respond, perform a local analog loopback (LAL) test. If LAL fails, contact Motorola customer service.
Double echo on characters typed	Check computer and modem's Echo (ATE) option.	If both have Echo=On (ATE1), turn one off (ATE0). (Echo is also known as half- or full-duplex.) If this does not solve the problem, contact Motorola customer service.
	Check the communications software's terminal setup.	

Table 5-1. Troubleshooting the 3460 Fast'R Modem

Problem	Diagnosis/Test	Possible Solution
CALL ESTABLISHMENT		
Modem won't answer	Check cabling.	
	Check parameters: • Answer (ATS) • DTR (AT&D)	Ensure that Answer is *not* set to Manual (S0=0). Set DTR=High (AT&D0), if DTR is not supplied by the computer.
	Check the modem's Line option (AT&L).	Ensure Line=Dial (AT&L0).
	Check that the TR LED is on (steady).	If the TR LED is not steadily lit, ensure the computer is supplying DTR.
	Check that the RI/OH LED is on when ring is present on the line.	Ensure that the remote modem is dialing the correct phone number.
Modem won't dial	If using DTR dialing, check: • Default dial option (AT∗DA) • Phone number at stored location • DTR option (AT&D)	Ensure default dial option is a valid phone number. Ensure that a number is stored. Ensure DTR=108.1 (AT&D5) or Tail (AT&D4). Ensure the computer is supplying DTR.
	Check the dialing environment.	If the modem is dialing out of a PBX, the modem may not recognize the non-standard dial tone. Set Blind Dial=On (ATS6).

Table 5-1. Troubleshooting the 3460 Fast'R Modem

Problem	*Diagnosis/Test*	*Possible Solution*
Cannot establish a connection	Check the disconnect code (AT**&V)**	Based on the disconnect reason, take the appropriate action.
	Check the modulation configuration: • Mod (AT∗MM) • Max Rate (AT∗MX) • Min Rate (AT∗MN)	Ensure that Mod=V.34 Auto (ATT∗MM0) or V.32bis Auto (AT∗MM2). Ensure that the local and remote modem modulation modes are compatible.
	Check the EC/DC Mode option.	Ensure Mode=AutoRel (AT∗SM3) on the local and remote modems.
Communication package displays On-line status before *calling or answering*	Check DCD (AT&C).	If DCD is not Normal, issue AT&C1 command.
A call is established but not maintained	Read the disconnect code.	Based on the disconnect reason, take the appropriate action.
Cannot hear connection sounds (stand-alone modems)	Check Speaker option (ATM).	If the speaker is not on, turn it on (ATM2).
	Check Volume option (ATL).	Adjust volume.

Table 5-1. Troubleshooting the 3460 Fast'R Modem

Problem	*Diagnosis/Test*	*Possible Solution*
DATA MODE		
The modem connects, but does not pass data	Check that the modem is in data mode (ATO)	If the modem is not in data mode, establish a connection with the remote modem.
	Check that the TD LED is steady on or flashing when data is being transmitted from the computer, indicating that the modem is receiving the data from the computer.	Check computer for EIA signal requirements. Ensure the modem is correctly cabled to the computer (use a straight-through cable for the RS-232 interface).
	Check the computer's flow control method.	Ensure that the computer's flow control is the same as the modem option (AT∗FL). If your communications software's file transfer protocol is used, *and* the software supports RTS/CTS Flow control, set Flow=RTS/CTS (AT∗FL3). If the package does not support RTS/CTS flow control, set Flow=Off (AT∗FL0).
	Verify line quality: • Run a remote digital loopback (RDL) or RDL with pattern test. • Disconnect the modem from the line and perform a local analog loopback (LAL) or LAL with pattern test (with modem flow control off).	After running the RDL, if no errors occur, the line is good. If errors occur, perform a manual retrain, or retry the phone call. If the device fails, contact Motorola customer service. If the device passes, you may have a line problem (contact your telephone company) *or* a problem with your software (check with software vendor).

Table 5-1. Troubleshooting the 3460 Fast'R Modem

Problem	Diagnosis/Test	Possible Solution
Modem disconnects prematurely	Ensure that the remote modem supports error correction.	If the remote modem does not support error correction, set Data Transfer Mode=Normal (AT∗SM1) and retry the call.
	Check the disconnect reason (AT&V=DR*n*, *n* is numeric code).	Take the appropriate action.
Data is garbled or lost	Check the modem flow control settings.	Ensure that the computer's flow control is the same as the modem option (AT∗FL). If your communications software's file transfer protocol is used, *and* the software supports RTS/CTS Flow control, set modem Flow=RTS/CTS (AT∗FL3). If the package does not support RTS/CTS flow control, set Flow=Off (AT∗FL0).
	Check that the modem's DTE rate (AT∗DE), parity (AT∗RP), and character length (AT∗CL) match the computer's settings.	If they do not match, adjust.

Table 5-1. Troubleshooting the 3460 Fast'R Modem

Problem	Diagnosis/Test	Possible Solution
	If Mode=Normal (AT∗SM1), check line quality: • Check CQMS parameters with Fast'RVu • Run a remote digital loopback (RDL) or RDL with pattern test • Disconnect the modem from the line. Run a local analog loopback (LAL) (AT&T1), or LAL pattern test (AT&T8), with modem flow control off.	If no RDL errors occur, the line is OK. If errors occur, perform a manual retrain, or retry the phone call. If the modem fails, contact Motorola customer service. If the modem passes, there may be a line problem (contact telephone company) *or* a software problem (check with software vendor).
Modem stops passing data	Modem could be in "flow off" condition (modem set for XON-XOFF and computer set for hardware flow control).	Set the modem for hardware flow control (AT∗FL3).
The modem connects at a lower rate than Max Rate (AT∗MX) option.	Check CQMS parameters with Fast'RVu. Ensure that the remote modem supports the modem rates you anticipate.	Line quality is not sufficient to support higher data rate. If line quality improves, the modem increases its speed automatically.
Modem retrains occur frequently	Retry call.	A line problem is indicated. Reduce the transmit rate (AT∗MX); if excessive retrains continue, contact telephone company.
CALL TERMINATION		
Modem takes too long to disconnect	Check whether remote modem supports PSTN cleardown.	If remote modem doesn't support PSTN cleardown, set local modem to Longspace Disconnect (ATY1).

Table 5-1. Troubleshooting the 3460 Fast'R Modem

Problem	Diagnosis/Test	Possible Solution
Modem doesn't disconnect when DTR drops or when communication s software does	Check modem's DTR option (AT&D)	Set DTR to an option other than High. Set DTR=Discon (AT&D2).
Communication software won't signal the modem to return to command state when escape sequence (+++) is issued	Check the delay between issuing the escape sequence (+++) and the ATH command.	Ensure the escape sequence (+++) complies with the modem's guard time requirements.
	Check whether the modem is set for AT ACU.	Set ACU Protocol=AT (AT∗AC1).
FILE TRANSFER MODE		
Can't transfer all of a file or aborts during transfer	Check the modem's flow control settings.	Ensure that the computer's flow control is the same as the modem option (AT∗FL).
File transfer takes longer than expected.	Determine the file transfer protocol.	Use another protocol; for example, YMODEM.

Table 5-1. Troubleshooting the 3460 Fast'R Modem

Problem	Diagnosis/Test	Possible Solution
LEASED-LINE OPERATION		
Modem won't connect	Determine whether modems are assigned to answer and originate.	Ensure one modem is set to answer (AT∗CA1) and one to originate (AT∗CA0).
	Run an LAL pattern test (AT&T8) on both modems.	• If errors are found on either end, contact Motorola customer service. • If the modem passes the test, you may have line problems; contact your telephone company.
	Check the modulation configuration: • Mode (AT∗MM) • Max Rate (AT∗MX) • Min Rate (AT∗MN)	Ensure that the local and remote modem modulation modes are compatible.
	Check local and remote leased line transmit level (AT∗LX).	• USA: if operating on a leased line, set to 0 (AT∗LX0) • If the transmit level is adjustable in your country, and the modems are running back-to-back, adjust it to approximately -15 dB (AT∗LX15)

Running Diagnostic Tests

This section describes loopback, busy out, and retrain tests, which analyze local- and remote-modem performance and the telephone line to assist you in isolating network problems. These tests can be initiated:

- With AT commands from an attached PC or terminal
- With commands from Fast'RVu
- With commands from a Motorola network management system

IMPORTANT: *Run one test at a time. Tests interrupt network data.*

Table 5-3. Running Diagnostic Tests

Test	*Description*	*AT Command*
Local Analog Loopback (LAL)	Tests local-modem transmit and receive circuitry	AT&T1
LAL Pattern	Tests local-modem circuits	AT&T8
Remote Digital Loopback (RDL)	Tests local- and remote-modem circuits and the telephone line	AT&T6
Local Digital Loopback (LDL)	Tests local-modem telephone lines and circuits.	AT&T7
Busy Out	Lets the modem appear busy to incoming calls.	ATH1
Retrain	Lets you manually retrain the local and remote modems	ATO1
Terminate	Terminates a test in progress	AT&T0
LAL, LDL, and RDL tests using the EIA leads are not supported.		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide*.		

Appendix A
Regulatory Information

In This Appendix

This section contains regulatory and safety approval declarations and information for the 3460 Fast'R modem and the AccessWay enclosure.

Compliance with standards allows the modem to:

- Reliably inter-work with the network, to connect to remote sites, saving you time and phone charges
- Automatically select the highest-possible line rate
- Flexibly communicate with many applications and systems

EEC Directive Conformity

The CE mark appears on each CE-compliant product. The following statement explains its significance.

CE 168

This product is CE-marked to indicate compliance with the following EU directives.

- 73/23/EEC Low Voltage Directive
- 89/336/EEC EMC Directive
- 98/13/EEC TTE Directive (previously 91/263/EEC)
- 93/68/EEC CE Marking Directive

Note: These products support different features depending on product code. Features, such as leased-line connectivity and dial restoral vary with product code and from country to country. Please contact your Motorola representative for details on the appropriate product code for a region.

Products that bear the EU Permission to Connect symbol and Notified Body number are designated compliant to the 98/13/EEC Telecommunications Terminal Directive for the following types of connections:

- **PSTN**: All products bearing the EU permission to connect symbol have been approved in accordance with Council Decision 98/482/EC (CTR 21) for pan-European single terminal connection to the Public Switching Telephone Network (PSTN). However, due to differences between the individual PSTNs provided in different countries, the approval does not, of itself, give an unconditional assurance of successful operation on every PSTN network termination point.

  In the event of problems you should contact your equipment supplier in the first instance.

  Note: check settings, as advised in this section, before contacting your equipment supplier.

These products have further been assessed against the CTR21 "deltas" which ensure maximum compatibility with the PSTN networks of the EU. These deltas are collectively referred to as the ATAAB Advisory Notes. ATAAB is the EU committee with representation from all member states and is responsible for maintaining CTR21 and the additional tests called up within the advisory Notes (or deltas). Compliance with these Advisory Notes ensures correct interworking of the terminal equipment (modem) and the network.

Network Compatibility Declaration

Where indicated by the EU permission to connect symbol, this equipment is suitable for use on all PSTN networks within the EU. In order to maintain correct operation when interworking with the PSTN network, some restrictions to specific settings are advised. These are detailed below:

For PSTN Operation in Portugal

1.) Terminal equipment must answer an incoming call within two minutes from the start of the ringing signal, otherwise the exchange may stop providing Ring indication (ensures compliance with ATAAB note AN011).

The answer on ring count option (S0) should not be set to a value greater than 20 (factory default =0).

For PSTN Operation in All EU countries

1.) When dialing without dial tone detection, the network cannot guarantee acceptance of the dialing signal if these signals occur earlier than 3s or later than 5s after seizing the line (ensures compliance with ATAAB note AN01).

The Blind Dial Pause or Dial Wait option (S6) should be set between 3 and 5s. (factory default =4).

All other ATAAB Notes are automatically catered for by the modem.

- **Two-Wire Leased-Line**: All products bearing the EU permission to connect symbol have been approved to European Commission Decision "CTR 15" for pan-European connection to the network termination points of Open Network Provision(ONP) ordinary quality or special quality voice bandwidth two-wire leased-lines.
- **Four-Wire Leased-Line**: Products bearing the EU permission to connect symbol that are designed to support both two- and four-wire leased-line have in addition been approved to support "CTR 17" for pan-European connection to the network termination points of Open Network Provision (ONP) ordinary quality or special quality voice bandwidth four-wire leased-lines.

Regulatory Marking

Type-approval labels indicate compliance with country regulations:

- Stand-alone modems carry country-specific labels to indicate compliance.
- Specific combinations of AccessWay enclosures and Nest Cards are engineered for compliance to unique sets of regional/country-specific regulations. Each AccessWay enclosure carries all approval markings that the system is certified for when configured with valid combinations of modem cards. A summary of the valid AccessWay Enclosure/modem card configurations is provided in the Hardware Advisory Notice (Part No. T0022-06) that accompanies each modem card.

Country Statutory Statements: Canada

Industry Canada Equipment Attachment Limitations

Notice

The Industry Canada label identifies certified equipment. This certification means that the equipment meets telecommunications network protective, operational, and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements document(s). The department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some conditions.

Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations to this equipment made by the user, or any equipment malfunctions, may give the telecommunications company cause to request the user disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electrical inspection authority, or electrician, as appropriate.

The **Ringer Equivalence Number (REN)** assigned to each terminal provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all devices does not exceed 5.

Canadian Emission Statements

3460 Fast'R: This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le materiél brouilleur du Canada.

3460 AccessWay: This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le materiél brouilleur du Canada.

Country Statutory Statements: U. K.

Although this equipment can use either loop disconnect or DTMF signaling, only DTMF signaling performance is subject to regulatory requirements for correct operation. It is therefore strongly recommended that this equipment is set to use DTMF signaling for access to public or private emergency services. DTMF signaling also provides faster call setup.

Satisfactory operation of terminal equipment when connected in parallel (e.g., a telephone/fax via an adapter cable or via secondary wall socket(s)) is not guaranteed. Terminal equipment may be ringer equivalence number (REN) marked to provide guidance in this area. As a general guide, the telephone line normally supports devices in parallel with a total REN of 4. To assess your installation, sum the REN ratings of the parallel-connected terminal devices. Use a REN rating of 1.0 for this modem.

For compliant operation of this modem, do not change S-Register 6 to a value greater than 7.

Country Statutory Statements: U. S. A.

FCC Part 68 Registration Information

The Federal Communications Commission (FCC) has established rules which permit this device to be directly connected to the telephone network. Standardized RJ11C jacks are used for these connections. This equipment should not be used on party lines or coin lines.

If the telephone company requests information on the equipment attached to their lines, inform them of:

1 The telephone number to which the device is connected.
2 The ringer equivalence number (REN),
3 The USOC jack required, RJ11C, and
4 The FCC Registration Number

Note: Items 2 and 4 are indicated on the label attached to the bottom of the device.

The Ringer Equivalence Number (REN) is used to determine the number of devices that can be connected to your telephone line. In most areas, the sum of the RENs of all devices on any one line should not exceed 5.0. Excessive RENs on a line may result in devices not responding to incoming calls. To be certain of the number of devices that can be connected to the line, as determined by the total RENs, contact the telephone company to determine the maximum REN for the calling area.

If this device malfunctions, it may also cause harm to the telephone network. Should malfunction occur, disconnect this device from the network until the source of the problem can be determined and repair has been made. If this is not done, the telephone company may temporarily disconnect service.

The telephone company may make changes to its facilities, equipment, operations, and procedures that can affect the operation of your modem. If such changes affect the compatibility or use of this device, the telephone company is required to give adequate notice of these changes.

In the event of equipment malfunction, all repairs should be performed by Motorola, Inc., or an authorized agent. It is the responsibility of users requiring service to report this to Motorola or our authorized agent. Service can be obtained at:

Motorola, Inc., 20 Cabot Boulevard, Mansfield, MA 02048
(508) 261-4000

Fax Branding: The Telephone Consumer Protection Act of 1991 makes it unlawful for any person to use a computer or other electronic device, including fax machines, to send any message unless such message clearly contains in a margin at the top or bottom of each transmitted page or on the first page of the transmission, the date and time it is sent, an identification of the business or other entity, or other individual sending the message, and the telephone number of the sending machine or of such business, other entity, or individual. (The telephone number provided may not be a 900 number or any other number for which charges exceed local or long-distance transmission charges.) To program this information into your fax application, refer to the "Fax Setup on Windows" section in Chapter 2 and to your fax application documentation.

FCC Part 15 Emission Statements

This device complies with Part 15, Subpart B, of the FCC Rules. Operation is subject to the following two conditions:

1 This device may not cause harmful interference.
2 This device must accept any interference received, including interference which may cause undesired operation.

Warning: Changes or modifications not expressly approved by the party responsible for compliance may void the user's authority to operate this equipment.

3460 Fast'R: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15, Subpart B, of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. The equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Note: shielded network-management and DTE cables are required for compliance.

3460 AccessWay: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15, Subpart B, of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential environment is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Notes:

- Shielded network-management and DTE cables are required in all configurations for compliance
- Ferrite beads or sleeves are required for compliance:
    - — Around 50-pin Telco cables, in a straight-through configuration
    - — Around network-management cables, in a full-turn configuration

Product Safety Regulatory Marking

Regulatory labels indicate compliance with safety standards.

Modems and enclosures carry one of the following labels:

- UL, CSA, and TUV

Appendix B
Attention (AT) Commands

In This Appendix

This section describes modem control and management commands, selected fax commands, S-register information, and result codes and messages. For a complete list of fax commands, see the *3460 Fast'R Reference Guide* (part number T0022).

AT Command Set

AT (**AT**tention) commands are character sequences that you enter from a computer or network management system (NMS) to control and manage a modem.

AT Command Set

Command	*Option*	*Description*
+++	[none]	**Enter local-Escape (command) mode**
#####	[none]	**Enter remote-Escape (command) mode**
A/	[none]	**Re-execute last command**
AT*n*=**x**	*x*=new value	**Change S-Register *n* value**
AT*n*?	[none]	**Display S-Register *n* value**
A	[none]	**Answer Call**
D*n*	*n*= number	**Dial Telephone Number *n***
DS		**Dial From Phonebook**
	[none]	Modem dials number stored in Entry 1, if any
	n = 1 - 4	Modem dials number stored in Entry *n*
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	*Option*	*Description*
E		**Echo Async AT Commands to Terminal**
	E0	=Disabled
	E1	=Enabled. The modem echoes asynchronous commands to the computer.
H		**Busy Out Test**
	H0	=End Test. If busy out is enabled, disconnects the busy out condition. In escape mode, disconnects the modem.
	H1	=Initiate test. Makes the modem appear busy to incoming calls.
I		**Display Software Information**
	I0	=Display 336
	I1	=Display 000
	I2	=Display OK
	I3	=Display product model
	I4	=Display product model
	I9	=Display reason for last disconnect
L		**Speaker Volume**
	L0 or L1	=Soft
	L2	=Medium
	L3	=Loud
M		**Speaker Control**
	M0	=Speaker always off
	M1	=Speaker on, when dialing
	M2	=Speaker always on
	M3	=Security: Speaker on only during training
O		**Enter On-Line (Data) Mode** (Applies when modem is in command mode and attached to remote modem)
	O0	=Enter on-line (data) mode
	O1	=Enter on-line (data) mode and retrain
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	*Option*	*Description*
P		**Select Pulse Dialing** Has same effect as AT∗PT1
Q		**Display Result Code**
	Q0	=Enable. Result codes are displayed on the computer.
	Q1	=Disable
	Q2	=Originate. Display result codes only when modem is in Originate mode.
S		**Store Value in S-Register**
	S*x*=*n*	Store value *n* in S-Register *x*
T		**Select Tone Dialing** Has same effect as AT∗PT0
V		**Result Code Format**
	V0	Numeric Code
	V1	Text Description
X		**Control Call-Progress Reporting** Determines whether the modem waits for call progress signals or blind dials when establishing calls.
	X0	=Modem uses only NO CARRIER and CONNECT result codes.
	X1	=Modem uses only NO CARRIER, CONNECT, and CONNECT <Rate> result codes.
	X2	=Modem waits for dial tone and uses only NO CARRIER, CONNECT, CONNECT <Rate> and NO DIALTONE result codes.
	X3	=Modem detects busy signal and uses only NO CARRIER, CONNECT, CONNECT <Rate>, and BUSY result codes.
	X4	=Modem waits for dial tone and detects busy signal. Uses only NO CARRIER, CONNECT, CONNECT <Rate>, BUSY, and NO DIAL TONE result codes.
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	Option	Description
Y		**Send Longspace Before Disconnecting**
	Y0	=Off
	Y1	=On. The modem disconnects when it receives space longer than 1.6 seconds. When terminating a call, the modem sends continuous space for 4 seconds.
Z		**Load Option Set Into RAM** The new option set takes effect immediately.
	Z0, Z1	=Load Option Set 1
	Z2	=Load Option Set 2
		∗ Commands
∗AC		**Automatic Call Unit (ACU) Protocol**
	0	=None (use this option with leased line) When configuring the modem for V.25bis synchronous direct-dial operation (DTR Control=Tail or 108.1, AT&D4 or AT&D5), you must use this option.
	1	=AT ACU
	2	=V.25bis ACU
∗AP		**Adaptive Rate**
	0	=Disable
	1	=Enable. The modem monitors telephone line signal quality and negotiates the highest possible rate for a modem's modulation mode. You must enable Retrain (AT∗RT) to use Adaptive Rate.
∗AR		**V.34 Asymmetric Rate**
	0	=Disable
	1	=Enable
∗AS		**Answer in Restoral**
	0	=LL Fail
	1	=Always
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	*Option*	*Description*
∗**BK**		**Break-Signal Receipt Handling** Controls how the modem handles the break signal in reliable and auto-reliable data modes. Break signals are sent to the computer for a 1-second duration.
	0	=Destructive Expedited: modem passes break to remote site immediately; deletes all its buffered data.
	1	=Nondestructive Expedited: modem passes data to remote site immediately
	2	=Standard Non-expedited Non-destructive: modem passes Breaks in sequence with any buffered data
∗**CA**		**Call-Answering Mode** Applies in leased-line operation
	0	=Originate: modem does not generate answer-back tone when called
	1	=Answer: modem generates answer-back tone when called
	2	=Auto-Answer in Originate Mode: modem generates answer-back tone when called; becomes Originate modem when call established
∗**CL**		**Async Character-Length in Synchronous Direct (No-Buffering) Mode**
	0	=8-bit Baudot code
	1	=9-bit ASCII code, no parity
	2	=10-bit ASCII code with parity bit or EBCDIC code without parity bit
	3	=11-bit EBCDIC code without parity bit
∗**CM**		**Select Connect Message** Takes effect in call-progress reporting
	0	=Display computer rate
	1	=Display modem Receive rate
	2	=Display modem Transmit rate
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	*Option*	*Description*
∗DA		**Default Telephone Number to Dial When DTR 108=On**
	0	=Off, no default
	n	=Phonebook entry *n*, where *n* = 1 to 4, and a telephone number is stored in *n*
∗DB		**Receive-Data Buffer Delay**
	0	=Disable buffer delay timer
	1	=Enable. Buffer or S-Register 38. Starts the buffer delay timer immediately upon detection of the disconnect request. When the timer is operating, the modem continues to process the transmit or receive buffers. The modem disconnects when the buffers are empty or the timer expires, whichever occurs first. **Note:** When the modem is set for Direct mode, no data buffering occurs and the disconnect is immediate.
	2	=Buffer + S-Register 38. Prevents the timer from starting until either the transmit or receive buffers have emptied. The modem then disconnects. Once the timer expires, when the modem is set to Direct mode, data is not buffered and the timer starts immediately.
	3	=S-Register 38. Allows the timer to start immediately upon detection of a disconnect request. The request continues to process either its transmit or receive buffers. The modem disconnects when the timer expires, regardless of the buffer states. **Note:** In Direct mode, no data buffering occurs. However, the modem delays a disconnect until the timer expires.
∗DC		**Data Compression**
	0	=Disable. Motorola recommends that you disable data compression when you use remote configuration at rates of 9600 BPS and below, because data compression may produce fractured command responses that may be difficult to interpret. Although the displayed responses may be compromised, the configuration function works properly with or without data compression.
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	*Option*	*Description*
	1	=Enable. Data compression is attempted. If the modem is using LAPM error correction, it uses V.42bis data compression when **DC**=Enabled. **Note:** In an application with SDC enabled, LAPM error correction and V.42bis data compression *only* are used. With MNP error correction, the modem attempts to negotiate V.42bis and MNP-5 data compression with the remote modem. Depending on which data compression type the remote modem can accommodate, V.42bis or MNP-5 is used. Otherwise, no data compression is used.
∗DD		**Dial Wait Period (Pause After Dialing)**
	0	The modem waits 2 seconds for a dial tone.
	1	The modem waits 3 seconds for a dial tone.
	2	The modem waits 4 seconds for a dial tone.
	3	The modem waits 6 seconds for a dial tone.
	4	The modem waits 12 seconds for a dial tone.
	5	The modem waits 15 seconds for a dial tone.
	6	The modem waits 20 seconds for a dial tone.
	7	The modem waits 30 seconds for a dial tone.
	8	The modem waits 40 seconds for a dial tone.
	9	Dial wait is determined by setting S-Register 7.
∗DE		**DTE (Computer) Port Rate**
	0	=75 BPS
	1	=150 BPS
	2	=300 BPS
	3	=600 BPS
	4	=1.2 KBPS
	5	=2.4 KBPS
	6	=4.8 KBPS
	7	=7.2 KBPS
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	*Option*	*Description*
	8	=9.6 KBPS
	9	=12.0 KBPS
	10	=14.4 KBPS
	11	=16.8 KBPS
	12	=19.2 KBPS
	13	=21.6 KBPS
	14	=24.0 KBPS
	15	=26.4 KBPS
	16	=28.8 KBPS
	17	=31.2 KBPS
	18	=33.6 KBPS
	19	=38.4 KBPS
	20	=57.6 KBPS
	21	=115.2 KBPS
	22	=230.4 KBPS
	23	=Autobaud. The modem uses the autobaud feature to determine the rate at which to operate.
∗**DI**		**Leased to Dial Threshold** Determines the threshold for initiating restoral. Low/Fast is the most sensitive option–if three retrains occur within five minutes, the modem initiates restoral.
	0	=Low/Fast
	1	=Low/Slow
	2	=High/Fast
	3	=High/Slow
	4	=Immediate
∗**DM**		**Data Mode for Direct Mode**
	0	=Asynchronous, with V.14 Async-to-Sync Conversion and +++ Command Detection.
	1	=Synchronous
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	Option	Description
∗**DR**		**Automatically Redial Failed Calls** The modem waits for a country-specific time between redials. If the AT∗LN option is enabled, the modem dials all of the linked numbers before redialing.
	0	=Disable.
	n	*n*=0 to 15. Modem redials an unsuccessful call *n* times.
∗**DX**		**Transmit Level for Dialed Calls**
	n	*n*=0 to 20 (negative sign is assumed) dB
∗**EC**		**Error Correction Protocol**
	0	=V.42. The modems negotiate the use of LAPM or MNP error correction. The modems attempt to negotiate using LAPM. If unsuccessful, they attempt to negotiate using MNP.
	1	=LAP-M. The modems attempt to negotiate LAPM**.**
	2	=MNP. The modems attempt to negotiate MNP.
∗**FL**		**Flow Control Protocol** Allows the modems and computers in a link to control the flow of data when buffers near their capacity. Use some type of flow control when operating in the Normal or Reliable mode. Check the computer documentation to ensure that it supports the flow control you select. The +FL command also controls this value.
	0	=Disable
	1	=XOn/XOff. The local modem and computer operate flow control by passing characters embedded in the data stream between them. The XOFF character signals the transmitting device to stop sending data. The XON character lets the halted device start sending data.
	2	=DTR/CTS. *In asynchronous applications*, the local modem and computer use DTR/CTS signals to operate flow control.
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	*Option*	*Description*
	3	=RTS/CTS. *In asynchronous applications,* the local modem and computer use RTS/CTS signals to operate flow control. The terminal uses RTS to signal when its buffers are full. The modem uses CTS to signal when its buffers are full. An on-to-off transition signals the transmitting device to stop sending data; an off-to-on transition signals that data can flow.
	4	=XOn/XOff PT. XON/XOFF Pass-Through Flow Control. The local modem and computer operate flow control by passing characters embedded in the data stream between them. Check your computer manual to verify whether it recognizes XON/XOFF flow control.
∗HD		**Hold Dial Line** The originating modem uses the HD option to determine how long to hold a dial connection while testing a leased line. This parameter works only when the Initiate/Terminate Restoral parameter (*RE) is set to NM/Fast'RVu/Auto (option 4).
	0	=Off. Modem disconnects from the dial line as soon as it connects to the leased line.
	1	=1 minutes
	2	=2 minutes
	3	=3 minutes
	4	=4 minutes
	5	=5 minutes
∗LE		**Dial to Leased Threshold** Determines when the originating modem disconnects from a dial line and returns to leased-line operation.
	0	=Off
	1	=15 minutes
	2	=30 minutes
	3	=1 hour
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	Option	Description
	4	=2 hours
	5	=4 hours
∗**LF**		**Dial Line Filter** Enables the modem to improve performance on long local loops on dial lines. Site-specific.
	0	=Optimize for long local loops
	1	=Works best on some medium loops
	2	=Optimized for typical short and medium local loops
	3	Not recommended
∗**LN**		**Link Telephone Numbers** Lets you link telephone numbers stored in the modem's Phonebook. You can provide more than one number to call in case one is busy. If a call fails and the number is linked, the modem pauses and then calls the linked number. **NOTE**: With this feature enabled, the modem dials linked numbers before redialing the first number. To link numbers, enter AT∗LN, followed by the entry *n* of the number you want to link from, a comma, and the entry *m* of the number to link. Example: AT∗LN2,4. Here, 2 is linked to 4. To clear this link, enter AT∗LN2.
	m, *n*	Link number *m* to number *n*
∗**LS**		**Low-Speed Operation Protocol** Determines the low-speed modulation mode used when a higher (V.34, V.32bis, V.32, or V.22bis) modulation mode connection cannot be made while Mod=V.34 Auto, V32bis Auto or Auto V32. The default option is country-specific.
	0	=Bell
	1	=CCITT
∗**LX*n***		**Transmit Level for Leased-Line Calls**
	n	*n*=0 to 20 (negative sign is assumed) dB
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	*Option*	*Description*
∗MD		**PSTN Signaling** Determines the modem's disconnect signaling when operating in the V.34, V.32bis, or V.32 (coded or uncoded) modulation modes.
	0	=Disable
	1	=Enable
∗MM		**Modulation Mode** Determines the modulation mode used in data transmission. Changing mode resets AT∗MX (Max Rate) and AT∗MN (Min Rate) to their defaults for the mode selected.
	0	=V.34 Auto (Dial Only)
	1	=V.34 Only
	2	=V.32bis Auto (Dial Only)
	3	=V.32bis Only
	4	=V.32 Auto (Dial Only)
	5	=V.32 Only
	6	=V.32 Uncoded
	7	=V.23 Only
	8	=V.22bis Only
	9	=V.22 Only
	10	=212 Auto
	11	=V.21 Only
	12	=103 Only
	13	=V.23 Half Duplex (Dial Only)
∗MN		**Minimum Rate** Sets the minimum communication rate.
	0	=75 BPS
	1	=300 BPS
	2	=600 KBPS
	3	=1.2 KBPS
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	*Option*	*Description*
	4	=2.4 KBPS
	5	=4.8 KBPS
	6	=7.2 KBPS
	7	=9.6 KBPS
	8	=12.0 KBPS
	9	=14.4 KBPS
	10	=16.8 KBPS
	11	=19.2 KBPS
	12	=21.6 KBPS
	13	=24.0 KBPS
	14	=26.4 KBPS
	15	=28.8 KBPS
	16	=31.2 KBPS
	17	=33.6 KBPS
∗MS		**AT Message**
	0	=After CD signal
	1	=Before CD signal
∗MX		**Maximum Rate** Sets the maximum rate at which the modems communicate over the analog network.
	0	=75 BPS
	1	=300 BPS
	2	=600 BPS
	3	=1.2 KBPS
	4	=2.4 KBPS
	5	=4.8 KBPS
	6	=7.2 KBPS
	7	=9.6 KBPS
	8	=12.0 KBPS
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	*Option*	*Description*
	9	=14.4 KBPS
	10	=16.8 KBPS
	11	=19.2 KBPS
	12	=21.6 KBPS
	13	=24.0 KBPS
	14	=26.4 KBPS
	15	=28.8 KBPS
	16	=31.2 KBPS
	17	=33.6 KBPS
∗**NA**		**Network Control (NC) Address** Specifies a modem's network-management identifier. **Note**: if this command is issued while the modem is attached to a network-management system, the modem responds "NETWORK MANAGEMENT INHIBITED" and does not change its address.
	0	Default. Not a valid operating address.
	1-255	Available options
∗**NB**		**Buffer Option** Specifies the size buffers that store data received from a local computer. Use this parameter if computer-to-computer flow control is enabled, to reduce the amount of data sent to the remote computer when a flow-off condition is received at the local computer.
	0	=Regular. Normal capacity buffers.
	1	=Reduced. Reduced sized buffers, allowing less data to accumulate in the modem.
∗**ND**		**Display Stored Telephone Number**
	n	Telephone Number *n*, where *n* is 1-4.
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	*Option*	*Description*
∗NE		**Secondary Channel** The AT∗NE command controls secondary channel operation. You can enable and disable the secondary channel through the AT ACU, Fast'RVu (Commands menu), or an NMS. The option is saved in non-volatile memory. For more information, refer to the "Network Management (AT∗NE)" section in Chapter 3.
	0	=On. Enables the secondary channel.
	1	=Off. Disables the secondary channel.
∗NO		**Network Control Override Mode** When this parameter is enabled, a modem ignores network management commands, except status requests. When you connect to a modem that has Network Override enabled, Fast'RVu indicates this with the orange OR LED in its display. For more information, refer to the "Network Management (AT∗NE)" section in Chapter 3.
	0	=Off. Disables network management override.
	1	=On. Enables network management override.
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	Option	Description
∗NP		**Network Control Pass Through** Pass Through options affect only dial connections. Pass Through options determine: • How and whether a local modem passes network management commands to a remote modem • How and whether a remote master modem passes network management commands to other modems connected to it by: — Cables between their NM IN and NM OUT ports — A shared AccessWay enclosure backplane For more information, refer to the "Network Management (AT∗NE)" section in Chapter 3.
	0	A local modem, connected through its NC IN port to a local manager: • Passes *only the NC commands that are addressed to a remote modem* from its NC IN port to the in-band secondary channel • Passes only responses *that are addressed from a remote modem to the local manager* from the secondary channel to its NC OUT port. A remote modem receiving the local modem's commands does not pass them to its NC OUT port.
	1	A local modem, connected through its NC IN port to a local manager,: • Passes *only the NC commands that are addressed to the location (local address +100)* from its NC IN port to the in-band secondary channel • Passes only responses *that are addressed from a remote modem to the local manager* from the secondary channel to its NC OUT port.
	2	A local modem, connected through its network control-in (NC IN) port to a local manager, passes *all* NC commands to and from a remote modem, without filtering. The remote modem operates the same way.
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	*Option*	*Description*
∗**OS**		**DTE (Computer) Overspeed Compensation** Lets modem compensate when an async or sync device sends data to the modem faster than specified.
	0	=1%. Modem compensates up to 1.0%.
	1	=2.5%. Modem compensates up to 2.5%.
∗**PE**		**Password Protection Enable/Disable** Enables and disables the configuration- and telephone-protection Password. After enabling the function, set protection to lock the modem (AT∗PF).
	0	=Disable
	1	=Enable
∗**PF**		**Password Protection Lock** Locks the modem.
∗**PN**		**Password Protection Unlock** Unlocks a password-protected modem.
∗**PT**		**Dial Type**
	0	=Tone
	1	=Pulse
	2	=Automatic. The auto-call unit attempts to tone dial when initiating a call. If tone dialing is not possible, pulse dialing is used.
∗**PW**		**Password Change**
	x/y	Change password *x* to password *y.*
∗**RA**		**Remote Access** Determines whether a remote modem can be configured by the local modem.
	0	=Disable
	1	=Enable
∗**RD**		**Redial Last Number**
	n	*n*=number of times to try for a successful connection.
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	*Option*	*Description*
∗**RE**		**Initiate/Terminate Restoral** The originating modem determines when to initiate restoral.
	0	=Disable
	1	=NM/Fast'RVu Only
	2	=NM/Fast'RVu/DTR
	3	=NM/Fast'RVu/DTR/ACU
	4	=NM/Fast'RVu/Auto
∗**RP**		**Parity** Determines the method of checking for correct data transmission, applied to asynchronous and character-synchronous data formats.
	0	=V.25bis
	1	=Even
	2	=Odd
	3	=Mark
	4	=Space
∗**RR**		**Restoral Auto-Redial** Determines whether the originating modem can automatically redial, while in restoral, upon call failure or carrier loss.
	0	=Disable. Prevents modem from redialing automatically.
	1	=Enable
∗**RQ**		**Abort Remote Configuration**
		Ends a remote-configuration session. Remote changes are not saved. Both modems return to data mode.
∗**RS**		**RTS Control** Determines how the modem interprets the RTS signal on EIA/TIA 232-D Pin 4 (V.24 Circuit 105).
	0	=Normal. The computer controls data transmission with RTS.
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	*Option*	*Description*
	1	=High. The modem sets RTS high. Use this option if the computer does not provide RTS.
∗**RT**		**Auto Retrain** When enabled, the modem retrains if the specified bit error rate (BER) is exceeded.
	0	=Off. The modem does not automatically initiate retrains, but responds to retrains from a remote modem.
	1	=Low BER. The Low BER setting is more sensitive than the High BER setting.
	2	=High BER. The High BER setting is less sensitive than the Low BER setting. **Note:** Motorola recommends this setting for most applications.
∗**SD**		**Modem Speed Bar Display**
	0	=Display modem Receive Rate
	1	=Display modem Transmit Rate
∗**SM**		**Data Transfer Mode** Sets the async-application data transfer mode.
	0	=Direct. The modem connects to the computer directly. It does not use error correction. EC/DC OPT's menu options are disabled. In data mode, the computer rate must match the modem rate.
	1	=Normal. The modem provides rate-translation only; no error correction or data compression. The break type is standard. In data mode, the modem uses speed conversion (if enabled). This lets the modem automatically accommodate computers of different rates.
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	*Option*	*Description*
	2	=Reliable. In async applications, once the local modem connects with a remote modem, it attempts to establish an error-corrected link. The modem uses speed conversion (if enabled). The local modem disconnects if it cannot establish an error-corrected link. Enable terminal flow control in this mode. If the modem negotiates a connection in V.21 or Bell 103 modulation mode, it terminates the call. Note: the modem does not support LDL tests in this mode.
	3	=Auto-Reliable. Once the local modem connects with a remote modem, it attempts to establish an error-corrected link. The modem uses speed conversion (if enabled). This lets the modem automatically accommodate computers of different rates. The modem reverts to Normal mode if it cannot establish an error-corrected link.
∗TR		**Test Restoral** Determines how often the modem checks for loop current on the dial line, to determine whether the line is available.
	0	=Never
	1	=Daily
	2	=Weekly
	3	=Monthly
∗TT		**Call Time-Out** Determines how long the modem waits from the time it completes dialing to the time it detects answer-back tone from the remote modem. If the modem does not receive answer-back tone from the remote modem within the specified time, the modem disconnects.
	0	=Time-out After 30 secs.
	2	=Time-out After 60 secs.
	3	=Time-out After 90 secs.
	5	=Time-Out After Interval Stored in S-Register 7
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	*Option*	*Description*
∗VC		**V.25bis Character Code**
	0	=ASCII
	1	=EBCDIC
∗VF		**V.25bis Format**
	0	=BitSync
	1	=CharSync
∗VI		**V.25bis Synchronizing Idle Signal**
	0	=Mark
	1	=Character
∗VR		**V.25bis Response**
	0	=None
	1	=V.25bis
	2	=V.25 Rate
	3	=Val Only
∗XC		**Reliable Message** Applies to Reliable and Auto-Reliable data transfer modes. The local modem can send a reliable message to the computer with the normal connect message if both modems negotiated a reliable connection.
	0	=Disable.
	1	=Short-Form Message Code. The modem sends a message to the computer when a reliable connection is successful. The message indicates the local computer-to-modem data rate.
	2	=Long-Form Message. The modem sends a message to the computer when a connection is successful. The message indicates the local computer-to-modem data rate, and the error-correction and data-compression schemes.
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	*Option*	*Description*
∗ZC		**Callback After Incoming Call** Determines the source of the telephone number that your modem calls when it receives a valid access security password from the remote modem.
	0	=Off
	1 - 4	=Phonebook Entry 1 - 4 The answer modem calls back the specified Phonebook entry (even if the calling modem provides a callback number).
	10	=Remote The answer modem calls back, using the phone number supplied by remote modem.
	12	=Remote Index The answer modem calls back, using the remote modem's Phonebook index supplied by the remote modem.
∗ZD		**Dial Restriction** Defines dial command limitations.
	0	=Level 1 Restriction. The auto redial command is not allowed. The A/ command is not allowed if the previous command was a dial command. In both cases, the modem reports an ERROR message to the computer.
	1	=Level 2 Restriction. Same as Level 1 and only stored phone numbers may be dialed.
∗ZI		**Enter Access Security Group Password**
	0 - 9, A - D	=[Up to ten characters]
∗ZR		**Require Remote Telephone Number** Specifies whether a remote callback number is required when using AT∗ZC (Callback).
	0	=Off
	1	=On
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	Option	Description
∗ZV		**Verify Password** If access security is enabled, this option selects the method used to verify a password.
	0	=Disable. Password and callback are disabled.
	1	=Internal.The stored password is checked against the received password. See AT∗ZI (Enter Group PW?).
		& Commands
&C		**DCD Control** Determines how the modem signals computer with DCD on EIA/TIA 232-D Pin 8 (V.24 Circuit 109).
	0	=High. DCD is always asserted.
	1	=Normal. DCD is deasserted during dialing and while the modem is training with the remote modem. DCD is asserted in data mode. It is deasserted when the modem is disconnected from the telephone line.
	2	=ACU On. DCD is asserted when the modem is disconnected so that terminals requiring this signal can use the ACU. During dialing, DCD is deasserted until both modems train and are ready to pass data. DCD is asserted in data mode. DCD is deasserted momentarily on a disconnect.
	3	=Remote. Applies to simulated half-duplex applications; works only if the remote modem also supports RTS/DCD signaling. When the remote computer asserts RTS, DCD is asserted at the local modem. The local modem can receive data only during this period. Once the remote computer deasserts RTS, DCD is de-asserted at the local modem. The Rem RTS/DCD option lets you specify the RTS/DCD signaling.
	4	=Wink. DCD is always asserted; however, it is deasserted after disconnect and remains so momentarily
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	Option	Description
&D		**DTR Control** Determines how the modem interprets DTR signal.
	0	=High. The modem ignores DTR from the computer; it reads DTR as always asserted. Choose this option for DTR/CTS flow control with error correction, or if the computer does not provide DTR signal.
	1	=Escape
	2	=Disconnect
	3	=Reset. The modem hangs up (if connected) and loads the specified option set when an asserted-to-deasserted DTR transition occurs. If DTR is deasserted, the modem auto answers.
	4	=Tail
	5	=108.1. A deasserted-to-asserted DTR transition instructs the modem to connect to the telephone line. If the modem detects an incoming ring, it answers the call. If the modem does not detect an incoming call, it dials the number specified by the Default Dial option. An asserted-to-de-asserted DTR transition disconnects the modem from the telephone line. When configuring the modem for V.25bis synchronous direct-dial operation (DTR Control 108.1, AT&D5), the ACU option must be set to No ACU (AT∗AC0).
	6	=108.2. When the modem is disconnected from the telephone line and the computer asserts DTR, the modem responds to all AT commands. When the computer de-asserts DTR, the modem does not respond to dialing and answering AT commands, but responds to all other AT commands. The DTR signal must remain asserted throughout the connection. An asserted-to-de-asserted DTR transition disconnects the modem from the telephone line. If DTR is de-asserted, the modem does not auto answer.
	7	=Busyout
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	*Option*	*Description*
&F	[none]	**Re-Initialize Memory Now** Resets the modem to factory default settings. Option sets are restored to their original settings. Phonebook telephone numbers are deleted.
&G		**Guard Tone** Determines the guard tone used in V.22bis operation.
	0	=Off. The modem does not use a guard tone
	1	=550. The modem uses a 550 Hz guard tone
	2	=1800. The modem uses a 1800 Hz guard tone.
&I		**Display Modem ID**
	0	=Display Software Revision Number
	1	=Display Country Code
	2	=Display Product Code
	4	=Display NC Address (optional)
&L		**Line Type**
	0	=Dial. The modem operates on dial lines in dial applications only.
	1	=2-Wire Leased. The modem operates on a 2-wire leased line. The ACU immediately disappears.
	2	=4-Wire Lease. The modem operates on a 4-wire leased line. The ACU immediately disappears.
&M		**AT Format** Sets the data format when the AT ACU is in effect.
	0	=Async. The modem communicates asynchronously in command and data mode.
	1	=Sync Data. The modem communicates asynchronously in command mode (disconnected from the dial line), and synchronously in data mode.
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	*Option*	*Description*
	2	=DTR Dial. On a de-asserted-to-asserted DTR transition, the modem dials the Phonebook number specified by the Default Dial option. The modems transmit data synchronously. If DTR transitions from asserted to de-asserted, the modem hangs up and enters asynchronous command mode.
&P		**Pulse Cycle**
	0	=40%.The make/break ratio is 40:60.
	1	=33%. The make/break ratio is 33.5:66.5.
	2	=38%. The make/break ratio is 38.5:61.5.
&R		**CTS Control** Determines how the modem sets CTS signal. The modem signals the computer with CTS on EIA/TIA 232-D Pin 5 (V.24 Circuit 106). This is the state of the CTS signal after the modem's RTS setting is followed.
	0	=High. CTS is always asserted. Use this option with RTS/CTS or DTR/CTS Flow control.
	1	=Normal
	2	=ACU On
	3	=AsyncSync. CTS is asserted in asynchronous mode. CTS is de-asserted in synchronous, ACU mode. If the data transfer mode is synchronous, CTS is de-asserted during training and follows RTS in data mode. When CTS follows RTS in data mode, the setting of the RTS/CTS Delay option applies (if Mode=Direct).
	4	=RTS
&S		**DSR Control** Determines how the modem sets the DSR signal.
	0	=High. DSR is always asserted.
	1	=Normal. DSR is controlled by the modem.
	2	=DTR
	3	=Drop on Disconnect
	4	=Simulate Leased Line
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	Option	Description
&T		**Test**
	0	=End Test
	1	=Initiate Local Analog Loopback (LAL)
	3	=Initiate Local Digital Loopback (LDL). **Note**: this test is not supported in Reliable mode (AT*SM2)
	4	=Accept Remote Digital Loopback (RDL)=On
	5	=Accept Remote Digital Loopback (RDL)=Off
	6	=Initiate Remote Digital Loopback (RDL)
	7	=Initiate Remote Digital Loopback (RDL) Pattern
	8	=Initiate Local Analog Loopback (LAL) Pattern
&V		**Status Message**
	0	=Long Form
	1	=Short Form
&W		**Save Changes** Saves changes to a option sets made with AT commands. (If you do not save the changes made with AT commands, the modem does not store them in nonvolatile memory.) After selecting an option set (ATZ*n; n*=0, 1, or 2), and changing options, enter AT&W*n*. The modem displays *Saving Options*, then *Save Completed*!.
	0 or 1	=Save changes to Option Set 1
	2	=Save changes to Option Set 2
&X		**Clock Signal Source** Sets modem timing. Applies to synchronous applications. For most dial applications, use option 0.
	0	=Internal. The modem uses timing signals passed on EIA/TIA 232-D Pin 15 (V.24 circuit 114).
	1	=External. The modem uses external timing signals passed on EIA/TIA 232-D Pin 24 (V.24 circuit 113).
	2	=Loopback. The modem uses loopback timing signals passed on EIA/TIA 232-D Pin 17 (V.24 circuit 115).
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	Option	Description
&Y		**Power Up in Option Set**
	0	=Old. On power up the modem uses the last saved option set.
	1	=1. On power up the modem uses Option Set 1.
	2	=2. On power up the modem uses Option Set 2.
&Z*n*	*n*=1 - 4	**Select Phonebook Entry to Enter** Lets you store a telephone number in the modem's Phonebook, up to 50 characters. Enter AT&Z or AT∗CN, the entry (1-4), a comma, and the telephone number. For example, to store the number 1-222-555-444 in Entry 3, enter: AT∗CN3,12225554444<CR> If you enter AT&Z or AT∗CN without specifying: • An *entry*, the modem stores the number in Entry 1. • *A telephone number*, the specified entry's telephone number is deleted.

+F Commands

+F commands control fax operation.

For all fax parameters:

- The **AT+F[parameter]?** command returns the valid options for the parameter, or if the parameter is not supported, it returns ERROR. An example, showing the +FCLASS parameter, is below.
- The **AT+F[parameter]=?** command returns the current option for the parameter, or if the parameter is not supported, it returns ERROR. An example, showing the +FCLASS parameter, is below.

+FCLASS?		**Service Class.** Reads the modem's Service Class.
	0	Data modem
	1	Service Class 1 fax modem
	2.0	Service Class 2.0 fax modem

The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**

Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).

Default (pre-set) options are underlined.

AT Command Set *(continued)*

Command	Option	Description
+FCLASS=?		**Service Class.** Tests the modem's Service Class.
	0	Data modem
	1	Service Class 1 fax modem
	2.0	Service Class 2.0 fax modem
+FCLASS=*n*		**Service Class.** Specifies the modem's Service Class.
	0	Data modem
	1	Service Class 1 fax modem
	2.0	Service Class 2.0 fax modem
+FCR=*n*		**Receive Fax Data.** Specifies whether the computer can receive fax data.
	0	No
	1	Yes
+FLO=*n*		**Fax Flow Control** Specifies the computer/modem flow control. The *FL command also controls this value.
	0	None
	1	XON/XOFF in either direction
	2	RTS/CTS
+FMI?		**Manufacturer ID** Requests manufacturer ID from the modem when it is operating in Fax Class 1 mode (+FCLASS=1). The modem responds as follows: Motorola
+FMM?		**Modem ID** Requests modem ID from the modem when it is operating in Fax Class 1 mode (+FCLASS=1). The modem responds as follows: 3460
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

AT Command Set *(continued)*

Command	Option	Description
+FMR?		**Software Revision Level** Requests software revision ID from the modem when it is operating in Fax Class 1 mode (+FCLASS=1). The modem responds with the software revision level. Example: 4.0
+FPR=*n*		**Serial Port Rate** Specifies the computer/modem serial port rate.
	0	Autobaud
	1	2.400 KBPS
	2	4.8 KBPS
	3	7.2 KBPS
	4	9.6 KBPS
	5	12.0 KBPS
	6	14.4 KBPS
	7	16.8 KBPS
	8	19.2 KBPS
	9	21.6 KBPS
	10	24.0 KBPS
	11	26.4 KBPS
	12	28.8 KBPS
	13	31.2 KBPS
	14	33.6 KBPS
	16	38.4 KBPS
	24	57.6 KBPS
	48	115.2 KBPS
	96	230.4 KBPS
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**		
Parameters and options shown shaded gray vary by country. For your country's options, refer to the *3460 Fast'R Reference Guide* (T0022).		
Default (pre-set) options are underlined.		

Options Stored in Status (S-) Registers

Some AT command options are stored in status registers.

S-Register Command Cross-Reference

Register	*Parameter*	*Command (Default Value)*	*Description*
S0	Ring Count to Answer On*	ATS0=*n* (0)	Modem answers a call after ring *n*
S1	Current Ring Count*	ATS1 (0)	Counts rings (view only)
S2	Escape Code Character*	ATS2=*x* (43)	Defines character used to change from data mode to command mode.
S3	Return Character*	ATS3=*x* (13)	Set command-line termination character
S4	Line Feed Character*	ATS4=*x* (10)	Set response formatting character
S5	Backspace Character*	ATS5=*x* (8)	Set command-line editing character
S6	Wait For Dial Tone	ATS6=*n* (3)	Set duration
S7	Wait For Data Carrier (Country-specific for France only)	ATS7=*n* AT*DD9 AT*TT5 (30)	Set duration Dial Wait=S7 Call Timeout=S7
S8	Dial Modifiers	ATS0=*x* (3)	Set comma character
S10	DCD Loss Disconnect	ATS10=*n* (15)	Set delay duration; varies with the modulation mode: • V.34, V.32: — 0=Disabled — 1-19=Specified sec. — 20-255=20 sec. • V.22bis, V.21, B212, B103: — 0=Disabled — 1-255=Specified 0.1 sec

*Changed values are not automatically stored to non-volatile memory. To retain changed values, save them to an option set.

S-Register Command Cross-Reference *(continued)*

Register	*Parameter*	*Command (Default Value)*	*Description*
S11	DTMF Tone Duration	ATS11=*n* (72)	Set duration (ms)
S12	Escape Code Guard Time*	ATS12=*n* (50)	Set duration (0.02 sec.)
S18	Test Timer	ATS18=*n* (0)	Set duration (sec.)
S25	Delay Before Checking for DTR	ATS25=*n* (5)	Set duration (sec.)
S26	RTS/CTS Delay	AT261=*n* (0)	Set duration (0.01 sec.)
S30	Terminal Inactivity Disconnect	ATS30=*n* (0)	Set duration (10 sec.)
S38	Disconnect Buffer Delay	ATS38=*n* AT∗DB3 (5)	Set duration (sec.) Delay=S38
S41	Remote Escape Code*	ATS41=*x* (35)	Set character
S42	Remote Guard Time*	ATS42=*n* (50)	Set duration (0.02 sec)
S45	Access Security Tone	ATS45=*n* (5)	Set duration (sec.)
S46	Access Security Lead Digit Delay Time-out	ATS46=*n* (12)	Set duration (sec.)
S98	User defined bit-map	ATS98=*n* (0)	
	Bit 0	0	Disable auto-mode sequence to include V.23
		1	Enable auto-mode sequence to include V.23
*Changed values are not automatically stored to non-volatile memory. To retain changed values, save them to an option set.			

S-Register Command Cross-Reference *(continued)*

Register	*Parameter*	*Command (Default Value)*	*Description*
	Bit 1	0	Disable restoral indicator on EIA Pin 22, where asserted means restoral is active
		1	Enable restoral indicator on EIA Pin 22, where asserted means restoral is active
	Bit 2 - 7		Reserved
*Changed values are not automatically stored to non-volatile memory. To retain changed values, save them to an option set.			

Result Messages and Codes

The modem follows most AT commands with messages that indicate its responses or actions. The following table shows messages the modem sends in response to AT commands and operating events.

Result Messages and Codes

Text Form	*Numeric Form*
Call Progress Result Codes	
OK	0
CONNECT	1
RING	2
NO CARRIER	3
ERROR	4
NO DIALTONE	6
BUSY	7
NO ANSWER	8
Connect Message Result Codes, Reliable=Off	
CONNECT 300	30
CONNECT 600	31
CONNECT 1200	32
CONNECT 2400	33
CONNECT 4800	34
CONNECT 7200	35
CONNECT 9600	36
CONNECT 12000	37
CONNECT 14400	38
CONNECT 16800	39
CONNECT 19200	40
CONNECT 21600	41
CONNECT 24000	42
CONNECT 26400	43
CONNECT 28800	44
CONNECT 31200	45
CONNECT 33600	46

Result Messages and Codes

Text Form	*Numeric Form*
CONNECT 38400	47
CONNECT 57600	48
CONNECT 115200	49
CONNECT 230400	50
Connect Message Result Codes, Reliable=Short	
CONNECT RELIABLE	60
CONNECT 1200 RELIABLE	61
CONNECT 2400 RELIABLE	62
CONNECT 4800 RELIABLE	63
CONNECT 7200 RELIABLE	64
CONNECT 9600 RELIABLE	65
CONNECT 12000 RELIABLE	66
CONNECT 14400 RELIABLE	67
CONNECT 16800 RELIABLE	68
CONNECT 19200 RELIABLE	69
CONNECT 21600 RELIABLE	70
CONNECT 24000 RELIABLE	71
CONNECT 26400 RELIABLE	72
CONNECT 28800 RELIABLE	73
CONNECT 31200 RELIABLE	74
CONNECT 33600 RELIABLE	75
CONNECT 38400 RELIABLE	76
CONNECT 57600 RELIABLE	77
CONNECT 115200 RELIABLE	78
CONNECT 230400 RELIABLE	79
Connect Message Result Codes, Reliable=Long	
CONNECT RELIABLE EC=(x) DC=(y)	60
CONNECT 1200 RELIABLE EC=(x) DC=(y)	61
CONNECT 2400 RELIABLE EC=(x) DC=(y)	62

Result Messages and Codes

Text Form	*Numeric Form*
CONNECT 4800 RELIABLE EC=(x) DC=(y)	63
CONNECT 7200 RELIABLE EC=(x) DC=(y)	64
CONNECT 9600 RELIABLE EC=(x) DC=(y)	65
CONNECT 12000 RELIABLE EC=(x) DC=(y)	66
CONNECT 14400 RELIABLE EC=(x) DC=(y)	67
CONNECT 16800 RELIABLE EC=(x) DC=(y)	68
CONNECT 19200 RELIABLE EC=(x) DC=(y)	69
CONNECT 21600 RELIABLE EC=(x) DC=(y)	70
CONNECT 24000 RELIABLE EC=(x) DC=(y)	71
CONNECT 26400 RELIABLE EC=(x) DC=(y)	72
CONNECT 28800 RELIABLE EC=(x) DC=(y)	73
CONNECT 31200 RELIABLE EC=(x) DC=(y)	74
CONNECT 33600 RELIABLE EC=(x) DC=(y)	75
CONNECT 38400 RELIABLE EC=(x) DC=(y)	76
CONNECT 57600 RELIABLE EC=(x) DC=(y)	77
CONNECT 115200 RELIABLE EC=(x) DC=(y)	78
CONNECT 230400 RELIABLE EC=(x) DC=(y)	79

Result Messages and Codes

Text Form	*Numeric Form*
Remote Configuration Result Codes	
RC DENIED	12
RC ESTABLISHED	13
RC COMPLETE	15
RC ABORTED	16
Miscellaneous Result Codes	
PASSWORD PROTECTED	18
NETWORK MANAGEMENT INHIB-ITED	19
Test Pattern Result Code	
NO SYNC ACHIEVED	20
Fax Class 1 Result Codes	
OK	0
CONNECT	1
NO CARRIER	3
ERROR	4
+FCERROR	+F4
+FRH:3	-
RING	2
NO DIALTONE	6
BUSY	7
NO ANSWER	8

Appendix C
Specifications

In This Appendix

This appendix describes the physical characteristics, connectors, and interfaces of:

- The 3460 Fast'R stand-alone modem
- The 3460 Fast'R modem card
- The AccessWay enclosure, backplane, and power supply
- The Vanguard 3460 V.34 DaughterCard modem card

For Vanguard 3460 V.34 Daughtercard specifications not shown here, refer to the Vanguard documentation.

Physical Characteristics

Physical Properties

Property	*Modem Card*	*AccessWay*	*Stand-Alone*	*Vanguard Daughter-card*
Height	6.32"	7"	1.8"	0.9"
Width	0.7"	19"	6.8"	2.95"
Depth	8.9"	9.5"	10.2"	8.85"
Weight	1 lb.	20 lb.	2 lb.	2 lb.
Heat Output	5 Watt	105 Watt*	6 Watt**	2 Watt
*Fully-loaded enclosure *Includes wall-mount transformer.				
1 Watt= 3.4 BTU/Hr.				

The stand-alone modem has a single modem in a plastic housing. Units may be stacked on a shelf or rack. Clips for this purpose are included in an accessory kit.

Operating Modes

Data Operation

Full-duplex, point-to-point.

Accessway enclosure-card modems, Vanguard 3460 V.34 Daughtercard modems, and stand-alone units are fully interoperable.

Fax Operation

Standards

EIA 578 Class 1 Fax

EIA 592 Class 2.0 Fax

Modulation Modes

ITU-T V.17

ITU-T V.27ter

ITU-T V.29

ITU-T V.21

Environmental Limits

Operating Conditions

Condition	*Modem Card*	*AccessWay*	*Stand-Alone*
Temperature	Operating temperature: 32° to 122°F (0° to 50°C) maximum		
Relative Humidity	5% to 90% (noncondensing)		
Vibration and Shock	In approved shipping container, conforms to the National Safe Transit Association Percipient Test Specification requirements.		
The stand-alone modem requires locking clips for stacking units to a maximum recommended height of 9 units.			

Non-Operating Conditions

Condition	*Modem Card*	*AccessWay*	*Stand-Alone*
Temperature	-40° to +158°F (-40° to +70°C)		
Relative Humidity	5% to 90% (noncondensing)		
Vibration and Shock	In approved shipping container, conforms to the National Safe Transit Association Percipient Test Specification requirements.		

Electromagnetic Compatibility

The stand-alone modem, Fast'R modem card, and AccessWay enclosure conform to the following emissions standards.

- FCC PART 15A CLASS A (card and enclosure)
- FCC PART 15A CLASS B (stand-alone modem)
- IEC CISPR 22 and EN 55022 CLASS A (card and enclosure)
- IEC CISPR 22 and EN 55022 CLASS B (stand-alone modem)
- AS 3548, Class B
- EN 50082-1

AccessWay Enclosure Power Supply and Power Requirements

The enclosure backplane (Figure D-1) provides common power and communications connections for up to 16 modem cards.

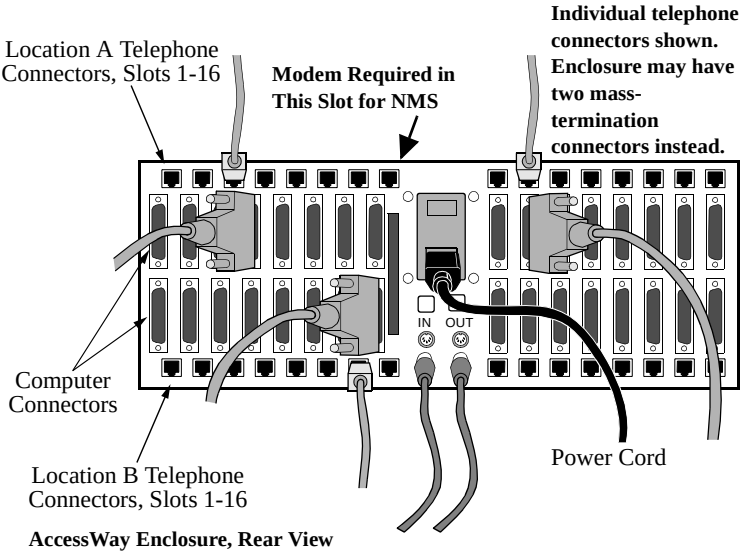

Location A Telephone Connectors, Slots 1-16
Modem Required in This Slot for NMS
Individual telephone connectors shown. Enclosure may have two mass-termination connectors instead.
IN
OUT
Computer Connectors
Location B Telephone Connectors, Slots 1-16
Power Cord
AccessWay Enclosure, Rear View

Figure D-1. AccessWay Backplane Connectors

The enclosure fits in a 19" equipment rack. It includes an AC or DC power supply module.

AC Power Supply Module

- Voltage: 100/120/220/240 VAC nominal (switch-selectable)
- Frequency: 50/60 Hz

DC Power Supply Module

- Voltage: -48VDC nominal

AccessWay Enclosure Power and Modem Operation

You can insert and remove modem cards while the enclosure is powered on and operational.

AccessWay Enclosure and Network Management

The enclosure provides a network management interface to a Motorola 9000 NMS. Up to four enclosures can be connected to one NMS connection. A modem card must be present in Slot 9 of each enclosure to transmit network management information to and from other modems in the enclosure.

Connectors and Interfaces

AccessWay Enclosure Connectors and Interfaces

Telephone Connectors, Modems That Support Two-Wire Leased or Dial Connections

MODEM A and MODEM B Individual Connectors*	
Interface: RJ-11	
Connection Type: Two-Wire Leased or Dial Line	
Pin	**Function**
3	Ring
4	Tip
MODEM A and MODEM B Mass Line-Termination Connectors	
Interface: RJ-21X.	
Connection Type: Two-Wire Leased or Dial-Line	
Pin	**Function**
1	Slot 1 Modem Card Tip
26	Slot 1 Modem Card Ring
2	Slot 2 Modem Card Tip
27	Slot 2 Modem Card Ring
...	...
8	Slot 8 Modem Card Tip/
33	Slot 8 Modem Card Ring
9 - 17	None
34 - 42	None
18	Slot 9 Modem Card Tip
43	Slot 9 Modem Card Ring
19	Slot 10 Modem Card Tip
44	Slot 10 Modem Card Ring
...	...
25	Slot 16 Modem Card Tip
50	Slot 16 Modem Card Ring
*AccessWay backplanes labeled "Modem A/Modem B" do not support four-wire leased-line connections.	

Telephone Connectors, Modems That Support Two- or Four-Wire Leased or Dial Connections

LINE A Connectors	
Interface: RJ-11	
Connection Type: Two- or Four-Wire Leased Line or Dial Line	
Pin	**Function**
2	Four-Wire Rx Tip
3	Dial-Line Ring/Two-Wire Ring/Four-Wire Tx Ring
4	Dial-Line Tip/Two-Wire Tip/Four-Wire Tx Tip
5	Four-Wire Rx Ring
LINE B Connectors	
Interface: RJ-11	
Connection Type: Two-Wire Leased or Dial Line	
Pin	**Function**
3	Two-wire Leased Line/Dial-Line Ring
4	Two-wire Leased Line/Dial-Line Tip

The enclosure has up to 32 female DB25 connectors for connection to a computer (DTE), which support a subset of the ITU-T V.24 and EIA/TIA-232E specifications.

Computer Interface Pin-outs

V.24 Signal Number	*Pin*	*Circuit*	*Function*
103	2	BA/103	TXD
104	3	BB/104	RXD
105	4	CA/105	RTS
106	5	CB/106	CTS
107	6	CC/107	DSR
102	7	AB/102	Signal Ground
109	8	CF/109	DCD
114	15	DB/114	TXCLK
Pins not listed here are not used.			

Computer Interface Pin-outs (continued)

V.24 Signal Number	*Pin*	*Circuit*	*Function*
115	17	DD/115	RXCLK
108.x	20	CD/108.1/2	DTR
125	22	CE/125	RI
113	24	DA/113	XTCLK
Pins not listed here are not used.			

The enclosure has RJ-11 connectors *or* mass-termination connectors for the dial and two-wire leased line telephone interface.

RJ-11 Interface Pin-outs

Pin	*Function*
3	Ring
4	Tip
Pins not listed here are not used.	

Mass-Termination Interface Pin-outs

Pin	*Function*
1 through 25	Tip
26 through 50	Ring
Pins not listed here are not used. A 50-pin connector provides connections to 16 modems. Tip-ring pin pairs are: 1 and 26; 2 and 27; and so on.	

In some countries, the telephone interface requires an adaptor.

The enclosure has two female 8-pin DIN connectors for connection to a network management system.

Network Management Interface Pin-outs

Pin	*NM OUT*	*NM IN*
2	TXD	TXD
3	RXD	RXD
4	RTS	RTS
7	Signal Ground	Signal Ground
8	DCD	DCD
Pins not listed here are not used.		

The enclosure has one power interface connector.

Power Interface

Power Type	*Connector*
AC	Industry Standard
DC	Barrier strip

The off-line configuration (OLC) button is on the front of the modem card.

Pressing the button makes the modem enter command mode, in which you can change configuration options in synchronous or leased line environments.

Changing a Configuration With the OLC Button

Step	*Stage*
1.	Change one or more configuration options.
2.	Enter the Save to Option Set command (AT&W*n*, where *n* is 1 or 2).
3.	Enter the Option Set to Power Up In command (AT&Y*n*, where *n* is: 0 for last-loaded option set; 1 for Option Set 1, or 2 for Option Set 2)
4.	Press the OLC button. The modem restarts and powers up using the selected configuration option set.

Vanguard 3460 V.34 Daughtercard Connectors and Interfaces

Telephone Interface Pin-outs

DIAL Connector		
Interface: RJ-11		
Connection Type: Dial Line		
Pin	**Function**	
3	Ring	
4	Tip	
LEASE Connector		
Interface: RJ-11		
Connection Type: Two- or Four-Wire Leased Line		
Pin	**Two-Wire Function**	**Four-Wire Function**
2	Not used	Rx Ring
3	Ring	Tx Ring
4	Tip	Tx Tip
5	Not used	Rx Tip

Network Management Interface Pin-outs

Pin	***Signal***
2	TXD
3	RXD
4	RTS
7	Signal Ground
8	DCD
Pins not listed here are not used.	

Stand-Alone Modem Connectors and Interfaces

The stand-alone modem rear panel has one female DB25 connector to interface to the computer (DTE).

Computer Interface

Pin	*Circuit*	*Function*
2	BA/103	TXD
3	BB/104	RXD
4	CA/105	RTS
5	CB/106	CTS
6	CC/107	DSR
7	AB/102	Signal Ground
8	CF/109	DCD
15	DB/114	TXCLK
17	DD/115	RXCLK
20	CD/108.1/2	DTR
22	CE/125	RI
24	DA/113	XTCLK
Pins not listed here are not used.		

The stand-alone modem rear panel has two RJ-11 telephone connectors, labelled LINE and PHONE.

Telephone Connectors, Modems That Support Two-Wire Leased or Dial Connections

LINE* Connector	
Interface: RJ-11	
Connection Type: Two-Wire Leased-Line or Dial Line	
Pin	**Function**
2	Telset Ring (Alternative)
3	Two-wire Leased Line/Dial-Line Ring
4	Two-wire Leased Line/Dial-Line Tip
5	Telset Tip (Alternative)
PHONE Connector	
Interface: RJ-11	
Connection Type: Telephone	
Pin	**Function**
3	Telset Ring
4	Telset Tip
*Pins 2 and 5 are disconnected in some units. Pins not listed here are not used.	

Telephone Connectors, Modems That Support Two- or Four-Wire Leased or Dial Connections

PHONE/LINE Connector	
Interface: RJ-11	
Connection Type: Dial Line and Telephone Set	
Pin	**Function**
2	Telset Ring
3	Dial-Line Ring
4	Dial-Line Tip
5	Telset Tip

Telephone Connectors, Modems That Support Two- or Four-Wire Leased or Dial Connections *(continued)*

LEASE Connector	
Interface: RJ-11	
Connection Type: Two- or Four-Wire Leased Line	
Pin	**Function**
2	Four-Wire Rx Tip
3	Two-Wire Ring/Four-Wire Tx Ring
4	Two-Wire Tip/Four-Wire Tx Tip
5	Four-Wire Rx Ring

The stand-alone modem rear panel has two female 8-pin DIN connectors.

Network Management Interface Pinouts

Pin	*NMS OUT*	*NMS IN*
2	TXD	TXD
3	RXD	RXD
4	RTS	RTS
7	Signal Ground	Signal Ground
8	DCD	DCD
Pins not listed here are not used.		

The stand-alone modem rear panel has one power connector.

Power Interface

Power Type	*Connector*
Low Voltage AC	Industry standard hollow co-axial

The On (1)/Off (0) switch supplies and removes power to the modem.

A stand-alone modem includes a power transformer. The unit conditions the power supply.

Power Requirements

Characteristic	*Requirement at Main Supply*	*Requirement at Modem Input*
Voltage	100/120/230/240 VAC*	9 VAC
Frequency	50/60 Hz	50/60 Hz
Input Current	150/120/80/70 mA	800 mA
*The power transformer is rated for one of these settings.		

The off-line configuration (OLC) button is on the back panel of some stand-alone modems.

Pressing the button makes the modem enter command mode, in which the user in synchronous or leased-line environments can change configuration options.

Changing a Configuration With the OLC Button

Step	*Stage*
1.	Change one or more configuration options.
2.	Enter the Save to Option Set command (AT&W*n*, where *n* is 1 or 2).
3.	Enter the Option Set to Power Up In command (AT&Y*n*, where *n* is: 0 for last-loaded option set; 1 for Option Set 1, or 2 for Option Set 2)
4.	Press the OLC button. The modem restarts and powers up using the selected configuration option set.

Cards and stand-alone modems have the following front panel interfaces (Figure D-3, Figure D-3, and Figure D-4).

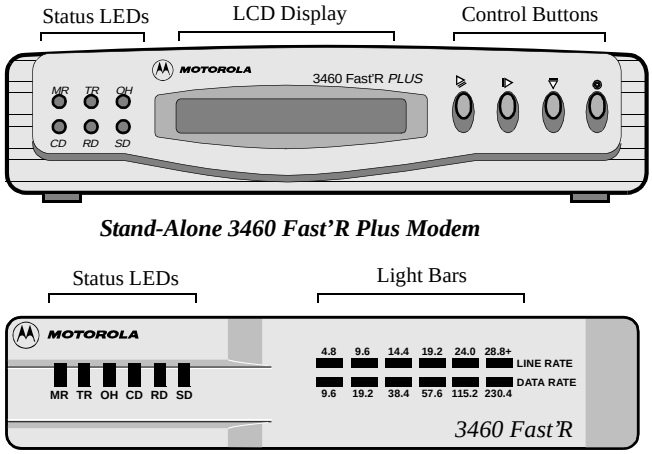


Figure D-2. Stand-Alone Modem Front Panels

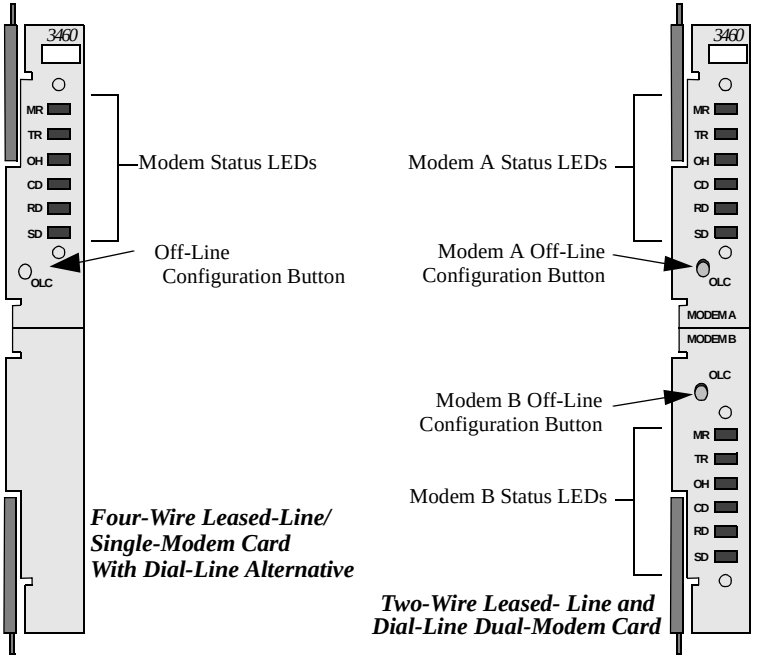


Figure D-3. Card Modem Front Panels

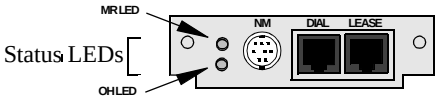


Figure D-4. Vanguard 3460 V.34 Daughtercard Panel

Status LEDs

Cards and stand-alone modems have the following front panel indicators. On a dual-modem card, each modem has a set of indicators. Vanguard 3460 V.34 Daughtercard modems have only the MR and OH indicators.

Status LED Displays

LED	*Description*
MR Modem Ready/ Test Mode	• **On**: modem is ready to interwork with computer • **Flashing**: Modem is in V.54 test mode
TR Transmit/Receive (Data Terminal Ready)	**On**: computer is asserting DTR (Circuit 108) to modem
OH Off Hook (connected to phone line)/ Ring Indicator	**On**: • Regular operation: modem is connected to dial line • Restoral operation: when regular operation is configured for leased-line or dial-line operation, and modem is operating on restoral dial line: modem is connected to dial line **Flashing**: modem receiving Active Ring **Off**: • In dial configuration: no call in progress, modem is disconnected from telephone line • In leased-line configuration: modem is connected to leased line
CD DataCarrier Detect	On: modem is receiving a valid carrier signal from a remote modem
RD Receive Data	Flashing: modem is transferring data received from a remote modem and command responses to computer
SD Send Data	Flashing: modem receiving transmit data and commands from computer

Light Bars

Some stand-alone modems have front-panel light-bars that display information about the modem's current performance:

Light Bar Displays

This:	*Indicates...*
Configured Line Rate & Link Utilization Light Bar (upper row):	
The rightmost lit or flashing LED	The configured modem receive* rate
The rightmost steadily-lit LED	Actual link utilization
A slowly-flashing LED	An under-utilized link
Configured Data Rate & Throughput (lower row):	
The rightmost lit or flashing LED	The maximum available throughput between modem and computer*
The rightmost steadily-lit LED	Actual throughput
A slowly-flashing LED	Actual throughput is lower than the maximum available
*Default. To display transmit rate, use the AT*SD1 command. Light bars flash briefly when a connection is made.	

On modems without light bars, display information with Fast'RVu.

Compatibility

The modem is compatible with modems that comply with the CCITT V-series specifications and ITU modulation modes, including the Motorola 326X Series, V.3400 Series, and "M" Series modems.

326X Leased-Line Operation Note

For optimum performance between a 3460 and a 326X in V.34 mode over a leased line, Motorola recommends the following configuration:

- Set the 3460 to V.34 Only modulation mode (AT*MM parameter)
- Set the 326X modulation mode to:
  - — V.34 Auto if it is set to Originate
  - — V.34 Only if it is set to Answer
- Set the maximum modem (DCE) rate (AT*MX parameter) to 31.2 on at least one modem.

Appendix D
Four-Button/LCD User Interface

Introduction

This appendix describes following elements that are present on 3460 Fast'R *Plus* stand-alone modem front panels:

- The menu-navigation buttons
- The LCD window

The four-button/LCD user interface lets you set configuration options and monitor modem operation directly through the front panel.

Menu Organization—Categories, Parameters, and Options

The front-panel menu tree is organized functionally into **categories**, **parameters**, and **options**:

- Categories appear in upper-case letters. Example: CONFIGURATION OPT'S.
- Categories have parameters. Some parameters are configurable; others indicate modem and call status. Example: Mode.
- Most parameters have options. Options affect the modem's operating characteristics. Example: Enabled.

The following indicators appear in the LCD window:

- An equals sign (=) indicates a currently selected option
- A colon (:) indicates that the displayed option is available but is not selected

Most parameters have a default option:

- Some defaults are determined by the assigned factory-preset option sets (preconfigured option sets). These defaults are exclusive to an option set.
- Some defaults are independent of the option set. They always have the same default, regardless of which factory-preset option set you use.

For a detailed view of the front-panel menu tree, refer to the *3460 Fast'R Plus Reference Card* (Part Number T0022-20).

Using the Front-Panel User Interface

Figure D-1 shows the 3460 Fast'R *Plus* modem front panel interface.

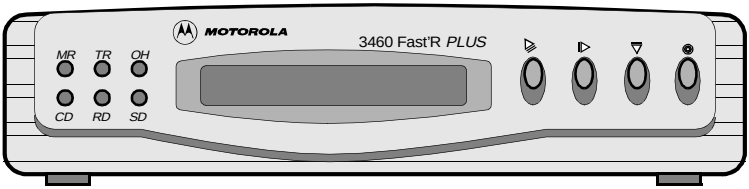


Figure D-1. 3460 Fast'R Plus Modem Front Panel Interface

LCD Display

The front panel has a 16-character alphanumeric LCD display. You access the configuration menu tree through the display, to:

- Configure the modem
- Store and display telephone numbers
- Initiate and answer calls
- Display status information
- Run on-line tests
- Enter passwords and network addresses

Control Buttons

The control buttons let you access parameters and options.

Front-Panel Control Buttons

Button	*Function*
Return	Steps up through the menu tree from a parameter to a category, or from a category to the default display. Example: from **Test**=, pressing displays the TEST OPTS category.
Across	Steps through the parameters in a menu category. Example: From **Test**=, pressing displays the Accept RDL option.

Front-Panel Control Buttons

Button	*Function*
Down	At the menu tree top level, steps through categories At a parameter within a category, steps through the options. Example: From **Test**=End Test, pressing displays **Test**=:LAL.
Enter	In the menu tree, selects an option and/or initiates an action. Allows you to toggle between using a telephone and the modem to establish a telephone connection.

Status LEDs

For descriptions of the status LEDs, refer to Chapter 2, "Basic Modem Setup".

Introduction

The following sections apply to U.S.A. customers only. Non-U.S.A. customers with questions or concerns regarding return procedures should contact their Motorola subsidiary or distributor.

Equipment Return Procedures

If you have questions about equipment return procedures, on-site service or unit-exchange service, call the Motorola Technical Support Center at (800) 544-0062 for advice and assistance.

In Case of Damage

If the equipment is damaged in transit, contact the shipper.

If you have additional concerns in case of failure, about missing parts, or to return equipment, contact your nearest Motorola representative.

To Return Equipment

For locations	***contact...***
Inside the U.S.A.	Motorola 20 Cabot Blvd. Mansfield, MA 02048-1193 Phone (800) 544-0062
Outside the U.S.A.	The nearest Motorola distributor. For a listing of our Sales and Service Offices, visit our Web site at: **http://www.mot.com/networking/corpinfo/**

Factory Repair

To return equipment for factory repair, call the Motorola ING Technical Support Center at (800) 544-0062, for return authorization and instructions. When you call, you will be given a Return Material Authorization (RMA) control number. Mark this number clearly on the shipping container for ease of identification and faster service. The RMA control number provides a convenient tracking reference for both parties. Please have the following information available for each piece of equipment you return:

- Product name and description
- Serial number
- Failure symptoms

Packaging Guidelines for Equipment Return

Data communications equipment or parts that are to be returned to Motorola for any reason must be properly packaged to prevent damage in shipment and handling.

If the original packing material and shipping container are available, reuse these items to return equipment. If these items are not available, it is your responsibility to package the contents in a manner that protects the equipment from damage during normal shipping and handling. Responsibility for damage to equipment during transit must be resolved between you and the carrier. Motorola can provide you with specific packaging instructions upon request.

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